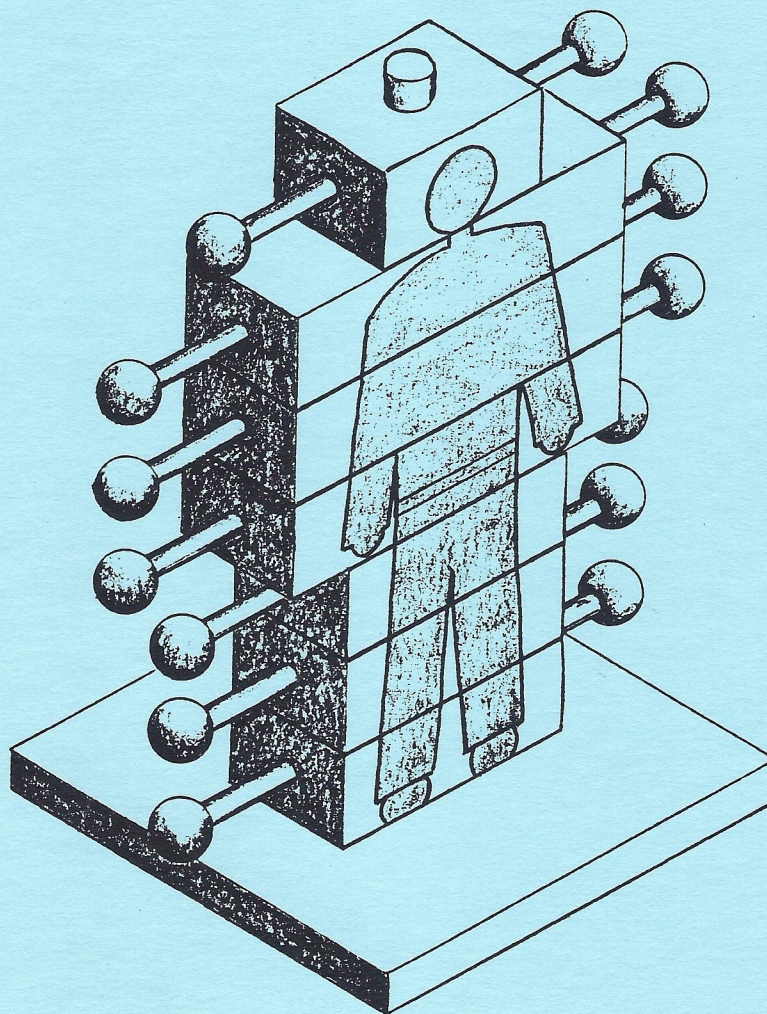


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# **LEKOTEK PLAN BOOK of ADAPTIVE TOYS**

## **VOLUME III**

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**National Lekotek Center**  
2100 Ridge Avenue  
Evanston, IL 60204  
(708) 328-0001  
FAX (708) 328-5514









## **ABOUT THE NATIONAL LEKOTEK CENTER**

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Lekotek is a system of support and information for families of children who have a disability or special need. In monthly play sessions specially trained Lekotek Leaders provide play modeling for families of children with disabilities and special needs. This enables the child to become more active in his family and the family more a part of the mainstream of society. Lekotek centers often offer other services to families in addition to the play sessions, including newsletters, educational workshops and social events, a mainstreaming program for preschoolers with disabilities or special needs, and the home loan of toys.

There are currently 54 Lekotek sites in 19 states, serving 3,500 families.

The National Lekotek Center is located in the Evanston Civic Center at 2100 Ridge Avenue, Evanston, Illinois 60204.

INNOTEK is the technology division of the National Lekotek Center. It provides technology related resources and training to children with disabilities and special needs, their families, and the professionals who work with them throughout the United States.

INNOTEK provides multi-dimensional technology resources. These services include graduate level technology training courses and consultation services for school districts, therapy centers, parent groups, and recreation programs.

INNOTEK also oversees the network of Compuplay Resource Centers throughout the United States. These centers offer computer play classes, drop-in centers, and software lending libraries to families with children with disabilities and special needs. Compuplay centers also provide inservice programs to teachers and therapists at the local level.

More information about the programs and services of Lekotek and INNOTEK can be obtained by calling the National Lekotek Center at (708) 328-0001.







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## PLAN

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## SOME SOURCES OF SPECIALTY ITEMS

Berry Bearing Company, 3900 S. Cicero, Chicago, IL 60650 312-780-6200  
Cadillac Plastic and Chemical Co., 26580 W. Eight Mile Road, Southfield, MI 313-583-1200  
Cherry Tree Toys, Inc., S. Jefferson Street, Belmont, Ohio 43718-0369 614-484-4363  
Fisher-Price, 636 Girard Avenue, East Aurora, NY 14052-1880 716-687-3000  
Klockit, Highway H North, Lake Geneva, WI 53147 414-248-1150



This toy plan book was produced through the efforts of Carl Gulbrandsen and William Grogg, Jr., both retired engineers who work with the National Lekotek Center. Special thanks to the many Lekotek Leaders who contributed their time and experience to make this book possible including the editors, Linda Schwartz, Raquel Reyes, and Rachel Reese. Layout and design were by Miriam S. Harris. The drafting was done by V. J. Jozaitis.

The mission of Lekotek is to assist in the integration of children with disabilities into the mainstream of society. This is done by helping families create a home atmosphere in which they can best nurture their children. Because children learn about their world through play, all Lekoteks have an extensive toy library for home loan.

It can be very difficult to find toys that truly meet the needs of children with severe physical or mental handicaps. Without certain tailored adaptations, many children could not experience the joy of playing with toys. It was for this reason Lekotek became interested in adapting toys for children with special needs.



This interest led to the first adapted toy plan book which was developed through a grant from The Quaker Oats Company. This book is one in a series of three which contain plans from Lekotek centers throughout the United States. Lekotek remains grateful for the continued support of The Quaker Oats Company in producing this series of books.

All the toys in this edition have been tested and used in Lekotek centers. Although the toys may have been developed to address the development of children who are physically or mentally limited in their abilities, it is the play value that is always the first consideration.

But, are the toys in this book only fun for children with special needs? Delightfully, no! It is through play that we can truly see that children are more alike than different. These toys will touch the joy in **all** children.



As you read this book, keep in mind the importance of multi-sensory stimulation. Achieving a balance of visual, auditory and tactile stimulation for the child with disabilities is an important consideration. In creating toys from these plans keep in mind the following suggestions for sensory stimulation.

### **VISUAL**

It is recommended that colors used to paint the toys be bright and clear shades of red, blue, green and yellow. While the use of bright colors and two-color patterns can actually reinforce learning, **excessive** use of bright colors or painted patterns on toys may be overstimulating. When painting a toy, care should be taken to keep color variety to a minimum. A neutral background for the basic toy with auxiliary parts painted in one or more of the basic primary colors is recommended.

For many wooden toys, an application of a light coat of varnish is sufficient. This will provide a neutral background for any brightly colored parts and will aid in easy clean up.

### **AUDITORY**

Some children may startle or become frightened by loud bursts of sound. It is recommended that toys which are auditorily stimulating contain tonal qualities which are soft and melodic. Loud buzzers are not generally recommended.

### **TACTILE**

For toys which provide tactile stimulation, we recommend keeping each different component a markedly separate texture from the others. This serves to facilitate the child's ability to differentiate between them. In order that the tactile component of the toy be fully perceived by the child, it is recommended that the background consist of neutral or dark solid colors. When designing a toy remember that a child's hands are small and grip toys must be proportioned to their size.

### **PAINT SAFETY**

---

In 1977, the U.S. Consumer Product Safety Commission published an act that regulates, in the public interest, the use of lead-containing paint. This act bans the use of lead-containing paint on toys and other articles intended for use by children. The act requires that lead-containing paints bear on their labels the statement, "Do not apply on toys and other children's articles, furniture, or interior surfaces which may be occupied or used by children." **When buying paint for children's toys or furniture, carefully read the label for the assurance that the paint does not contain lead.**

Some of the toys in the plan books have specific material lists that call for electrical or electronic components for assembly.

The source of some of these items has frequently been a surplus merchandise dealer who specializes in odd lots, overruns and/or obsolete items. Some are new; some are used. Usually they are priced well below the original cost of the item.

The problem that has surfaced is that a certain item, after a year or more, may no longer be available from the source used at the time of the publication of the plan book. Anyone using the plan book should consider the instructions as a guide and not as a specific direction in building a particular Lekotek toy. With similar components, any person with a capacity to build these toys should be able to use substitute components from other sources and adjust dimensions accordingly. The results should be an equally enjoyable toy.

Most toy makers find it as easy to make several of the same toy as to just make one. Cut enough pieces for multiple toys at the same time. But it is a good idea to then assemble one complete toy first so that any corrections in the cuts can be made before you proceed to assemble the rest of the toys. You will just be multiplying the fun for some very lucky children!

All of the toys in this book with flat bases will benefit from the application of non-skid material or rubber pads to the bases. This will help keep the toy within reach and stable for the child with developing coordination. A good material to use is the lightest weight carpet padding sold commercially to keep small area rugs from slipping around on the floor. Often, a friendly carpet dealer will provide a toy maker with left over scraps at minimal (or no) cost. These can be easily cut to fit the base of the toy.



Play has been defined as "positive active engagement" and as "pleasurable, enjoyable, and positively valued." If you go to the experts, however, children will define play in one word...fun. Until recently, the role of play in child development was not taken seriously or was even seen as an obstacle to learning.

The special characteristics of play are in its positive foundations and opportunities to interact with the environment, including the people and objects which surround a child. Play is also unique in that it is spontaneous and freely chosen.

Play has been shown to be related to other qualities, such as creativity, problem solving, language, and social/emotional development. Visual, auditory and tactile stimuli which automatically result from simple toy interactions act as reinforcers and maintain the toy play behavior (Murphy, et al., 1986).

For children with disabilities, conventional and commercial toys and commercial educational materials alone may not be appropriate. Physical, cognitive and sensory impairments may prevent the children from operating and learning from these materials (Hanline et al., 1985). Adapted toys can address this problem. A child needs to react and interact in the relaxed manner that is characteristic of play. Successful play can often be reliant on the reactions of the person who plays with the child. Helping the child achieve a feeling of success is vital to that child's development of a positive self concept. A child may only need to touch a toy or art project in order to feel directly responsible for the finished product (Lindquist, 1977).

Adapted toys create a situation in which the child can have control. This can be an imaginary setting or a practical life situation. The important factor is that the control rest with the child. Coker (1984) states that as interest has increased in the earlier intervention of infants and toddlers with disabilities, so has the need for the development of materials to meet the needs of this younger population.

---

## **BIBLIOGRAPHY**

---

Coker, W. B., Jr. "Homemade Switches and Toy Adaption for Early Training with Nonspeaking Persons." *Language, Speech and Hearing Services in Schools* 15 (1984), pp. 32-36.

Hanline, M. F., Hanson, M. J., Veltman, M. A., & Spaeth, D. M. "Electromechanical Teaching Toys for Infants and Toddlers with Disabilities." *Teaching Exceptional Children* 18 (1985), pp. 20-29.

Lindquist, I. *Therapy Through Play*. London: Arlington Books, 1970.

Murphy, G., Carr, J., & Callias, M. "Increasing Simple Toy Play in Profoundly Mentally Handicapped Children: II. Designing Special Toys." *Journal of Autism and Developmental Disorders* 16 (1986), pp. 45-58.

**VIDEOTAPES** VHS only (V#'s for sales and R#'s for rental) Two-week rental requires a \$25.00 deposit by separate check. Postage and handling charge: \$3.50 for 1; \$5.00 for 2; \$8.00 for 3 or more.

**INTRODUCTION TO LEKOTEK** A beautiful 8-minute video about Lekotek, including scenes of Lekotek play sessions, computer sessions and comments from parents.

V100.....\$50.00 R100.....1 for \$15.00 and 2 for \$25.00

**TOY MAKING: CREATING FUN FOR THE CHILD WITH SPECIAL NEEDS** A 12-minute video targeted to audiences whom you would like to interest in making toys for your special kids. Not strictly a "how-to" but shows how easy it is to get involved.

V600.....\$35.00 R600.....\$10.00

**OPENING CLOSED DOORS** A 6.5-minute video of Compuplay, Lekotek's adaptive computer centers. V300.....\$50.00 R300.....1 for \$15.00 and 2 for \$25.00

**FRIENDS** An 8-minute video featuring the Preschool Mainstreaming Project at the National Lekotek Center. It demonstrates the value of placing children who have disabilities or special needs into regular preschool settings.

V200.....\$50.00 R200.....1 for \$15.00 and 2 for \$25.00

## **PUBLICATIONS**

**LEKOTEK PLAY GUIDE FOR CHILDREN WITH SPECIAL NEEDS** A discussion of toys and play for the parents of children who have disabilities. Postage and handling by weight and distance. P450.....\$3.75 each

**VOLUMES I, II and III of the LEKOTEK PLAN BOOK OF ADAPTIVE TOYS** Detailed plans and drawings for making switches, toy adaptations & wooden toys for children, especially those with handicaps. P600, P650 and P675

{ \$15.00 for 1 volume  
\$25.00 for 2 volumes  
\$12.50 each for 3 - 9 volumes  
\$11.25 each for 10 or more

Postage and handling charges:

\$1.00 to \$10.00.....\$1.50  
\$10.01 to \$17.00.....2.00  
\$17.01 to \$30.00.....3.00  
\$30.01 to \$60.00.....4.00

**INNOTEK SOFTWARE RESOURCE GUIDE 1990** A guide for the selection of computer software and hardware appropriate for children with special needs, ages 2 -14 yrs.

P850.....\$20.00 plus \$3.50 for postage and handling

**Prices are subject to change without notice. 1/18/90**



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**\$65.00**  
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[illegible]

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TELEPHONE \_\_\_\_\_

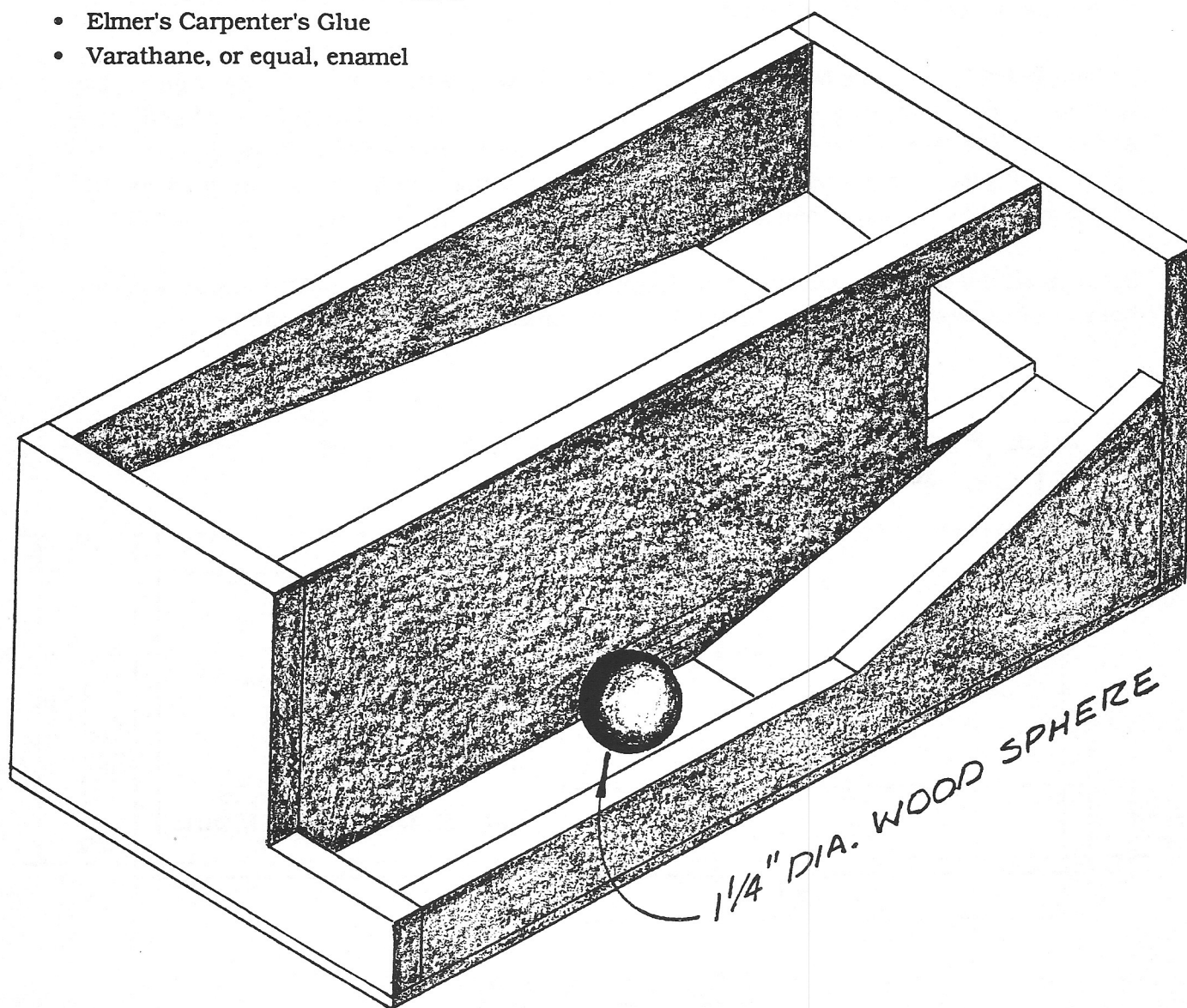


Here is a toy for the special child who understands cause and effect. Pick up a colored ball from outside below and put it inside above for a clattering roll down and out.

It looks very simple to make but it has some complicated cuts and bevels. The drawings, however, are very detailed and if each piece is measured and cut carefully, the toy will assemble nicely.

**MATERIALS NEEDED**

- One 11 5/8" x 5 1/2" piece of 1/4" plywood for the bottom (Item 14)
- One 30" x 12" piece of 3/8" birch plywood for remaining pieces
- 1" long #17 brads
- Four 1 1/2" colored wooden balls
- Elmer's Carpenter's Glue
- Varathane, or equal, enamel



**TOOLS NEEDED**

- Table saw
- Hammer, ruler, sanding block, etc.

**CONSTRUCTION SUGGESTIONS**

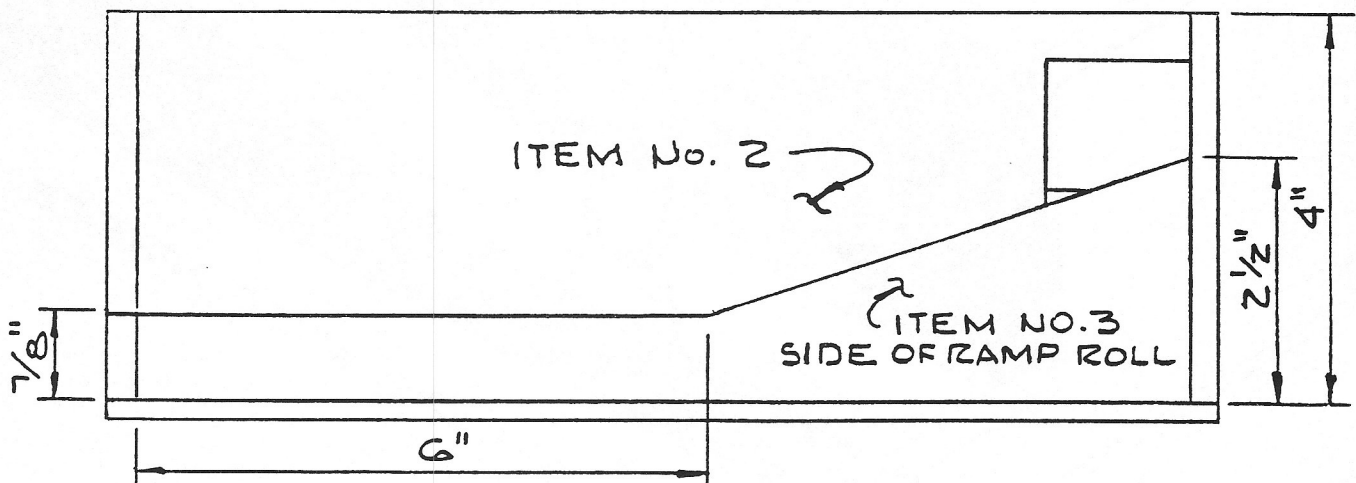
Follow the drawings piece by piece with reasonable care. Note that the actual plywood thickness is approximately  $1/16$ " less than nominal plywood thickness. The actual thickness of  $3/8$ " plywood is  $5/16$ ".

Start by cutting out Item No. 1 and follow with Items No. 2, No. 3, No. 4, No. 5 and No. 14. Using the 1" #17 brads, glue and nail the end pieces, Items No. 4 and No. 5, to the side pieces, Items No. 1, No. 2 and No. 3, as in the drawing of the assembled toy. Next, glue and nail the bottom piece, No. 14, to the assembly.

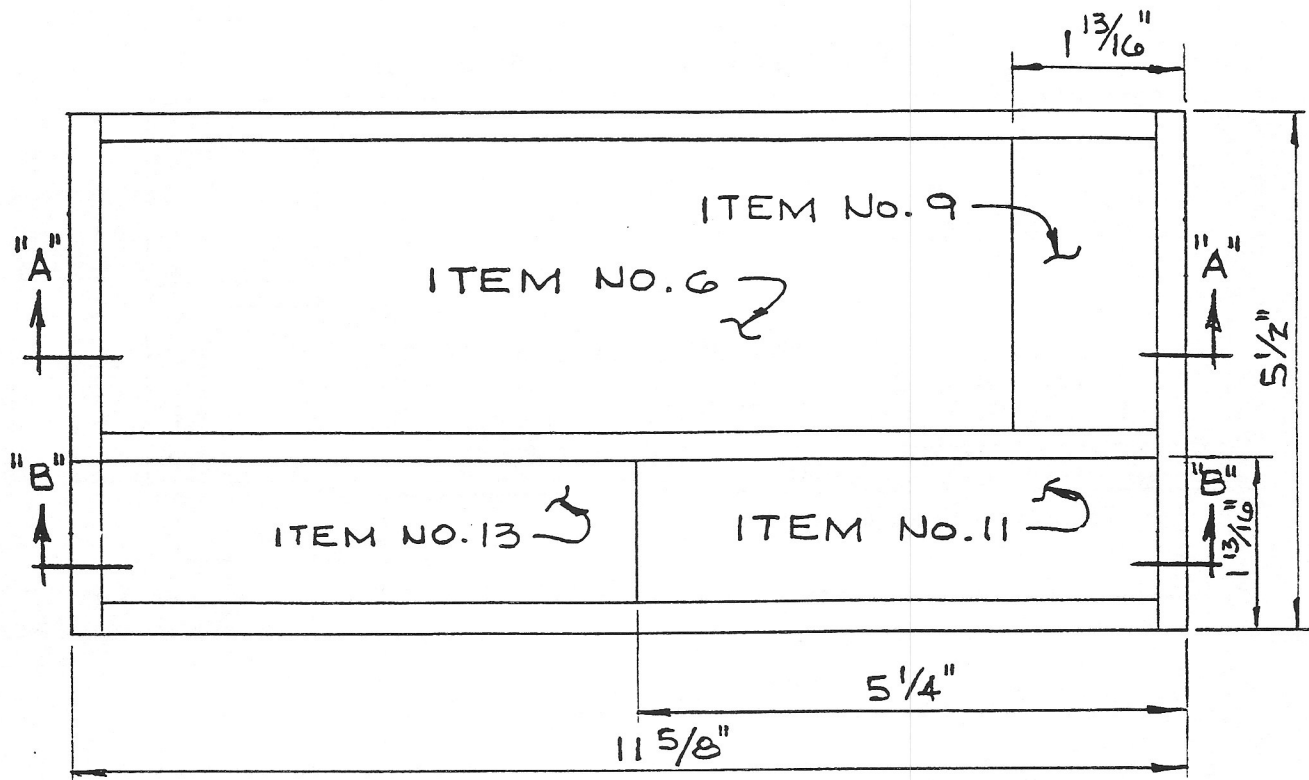
Cut out Items No. 7, No. 8 No. 10 and No. 12, the chocks. Using a small amount of glue, place the chock pieces as shown on Section "A-A" and on Section "B-B." Cut out Items No. 6, No. 9 and No. 11, the sloping pieces, and bevel the ends as shown on the Front Views for those items. Glue pieces No. 6 and No. 9 in place as shown on "Section A-A." Cut out Item No. 13 and glue it to the bottom. Then glue Item No. 11 in place, both as shown on "Section B-B."

Spray paint the entire assembly with two coats of enamel, drying thoroughly between applications. Use three colored wooden balls,  $1\frac{1}{4}$ " in diameter, to roll down the ramps.

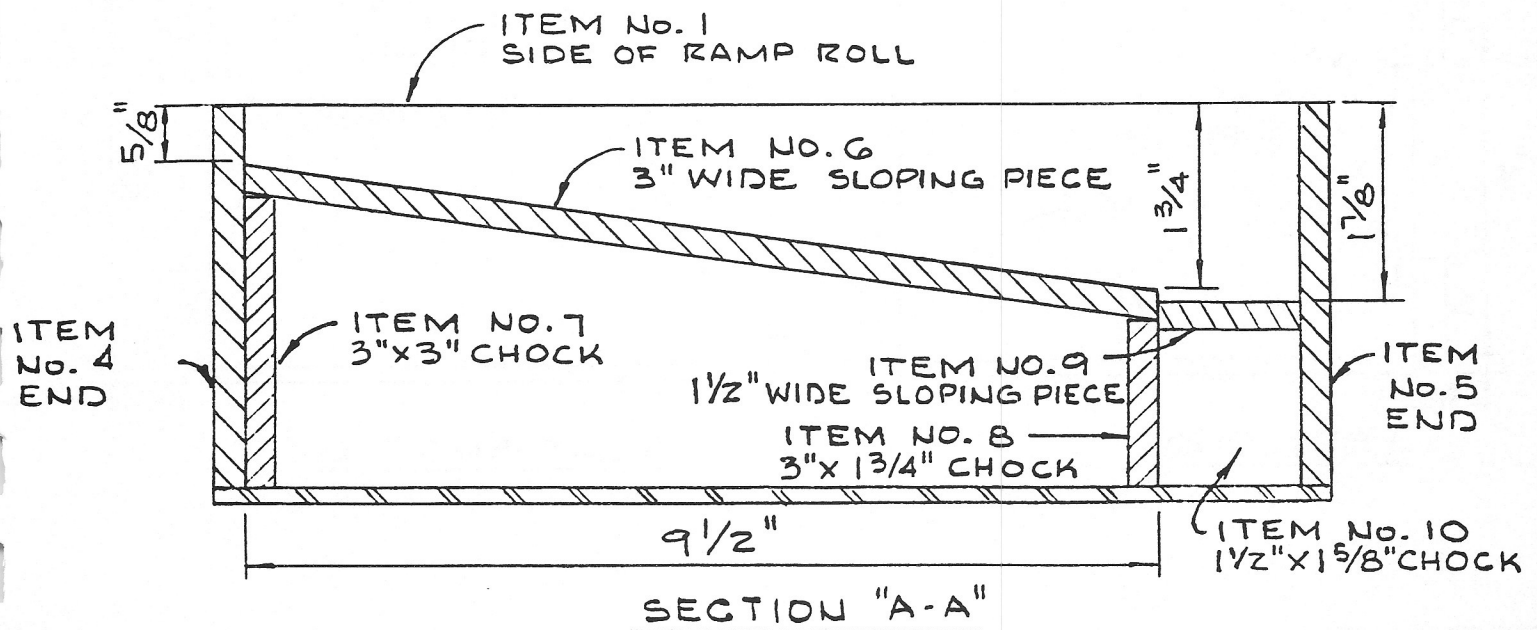
ALL PIECES TO BE SECURED WITH  
GLUE AND 1"-#17 BRADS



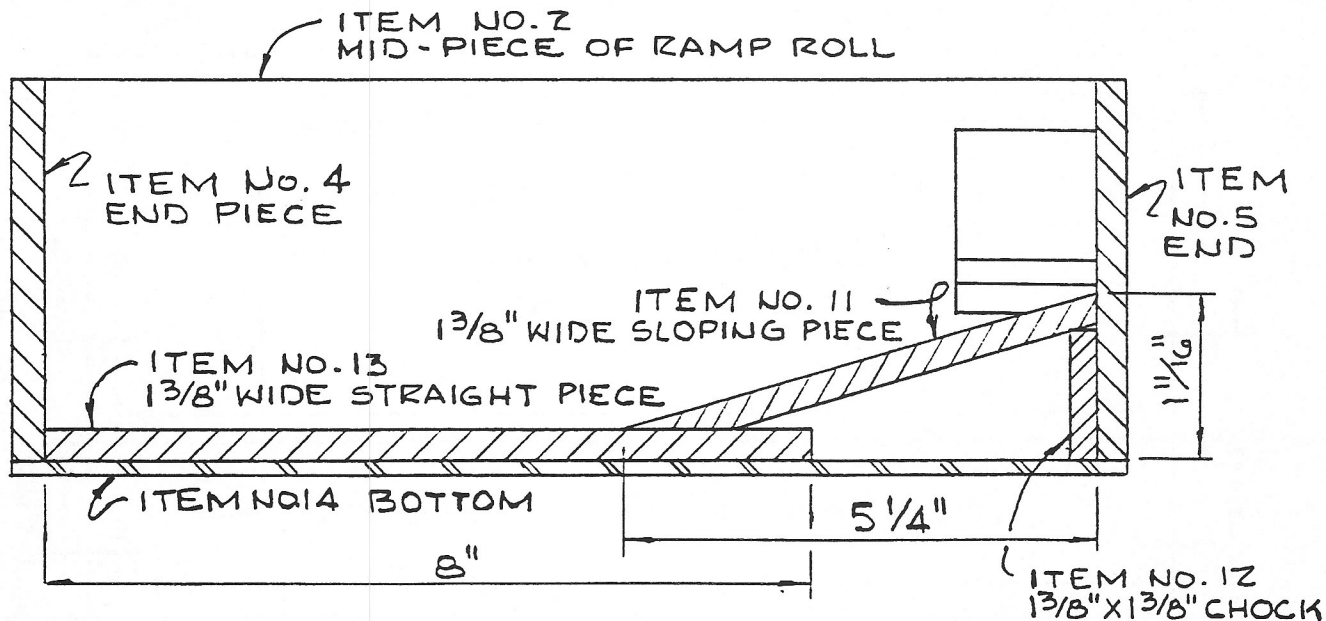
FRONT VIEW  
OF RAMP ROLL



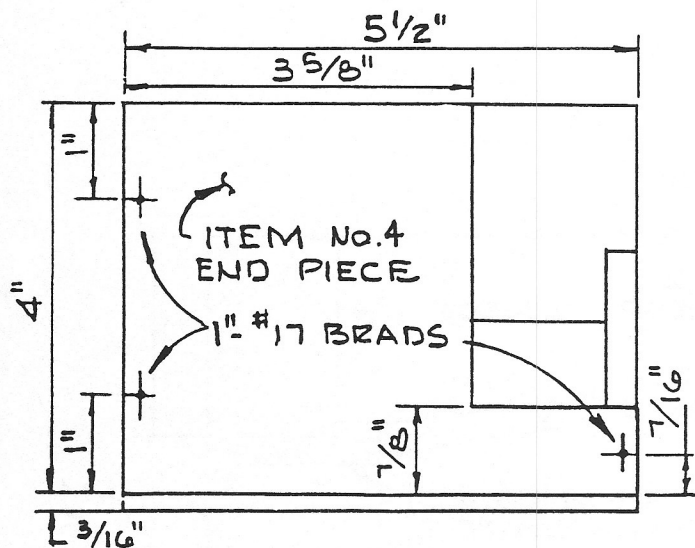
TOP VIEW  
OF RAMP ROLL



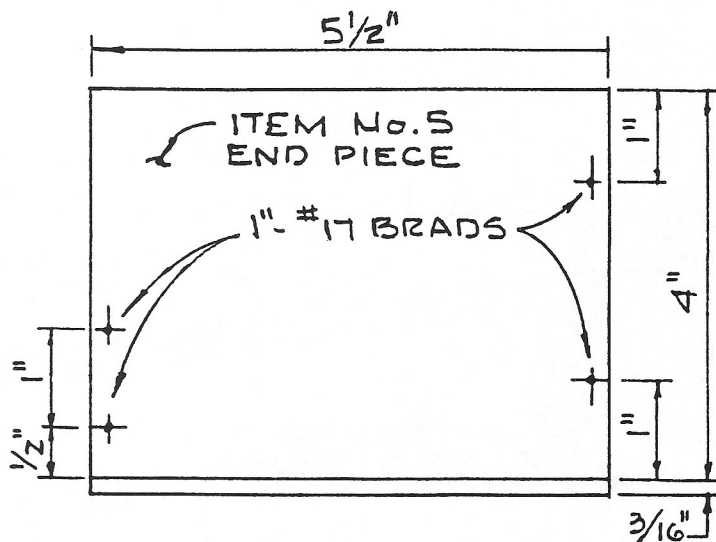




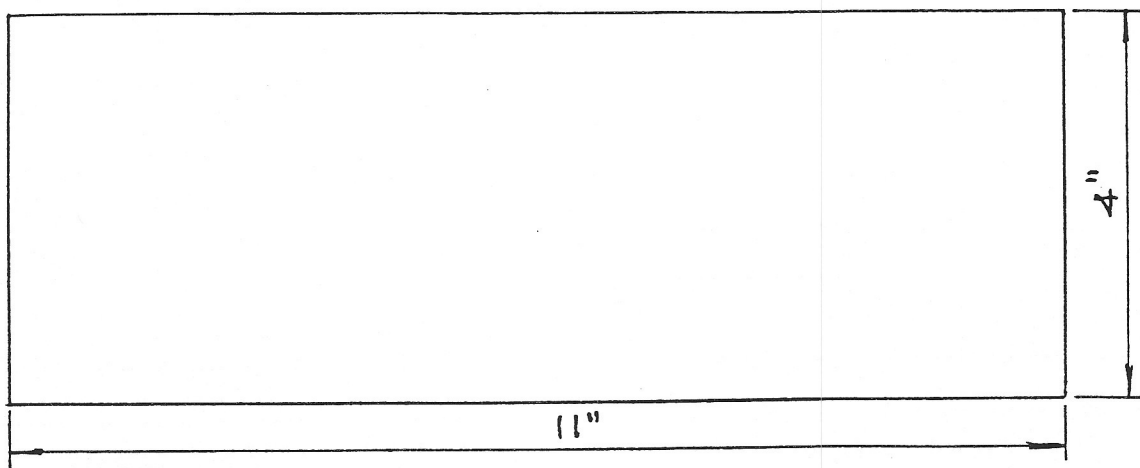
SECTION "B-B"



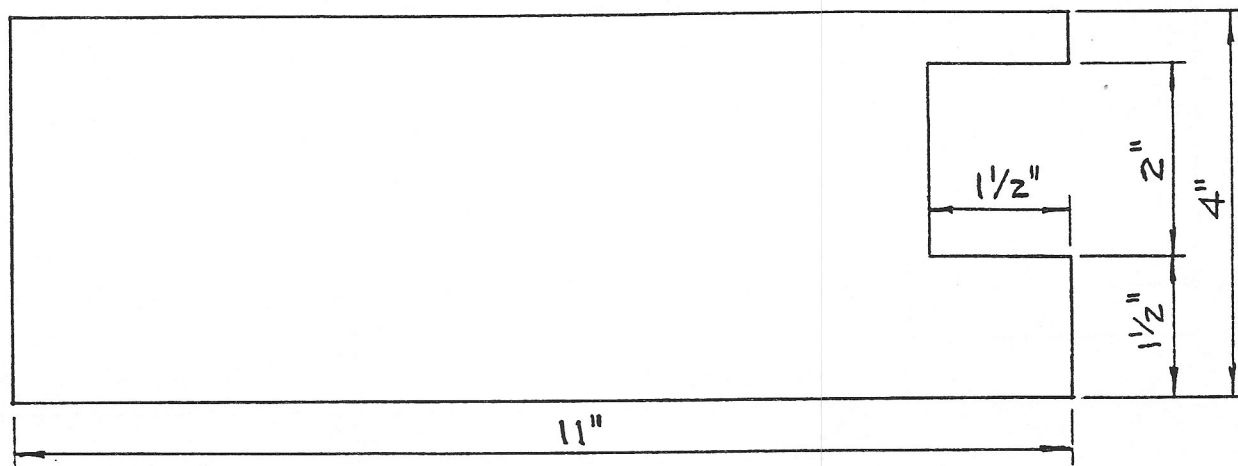
LEFT END VIEW



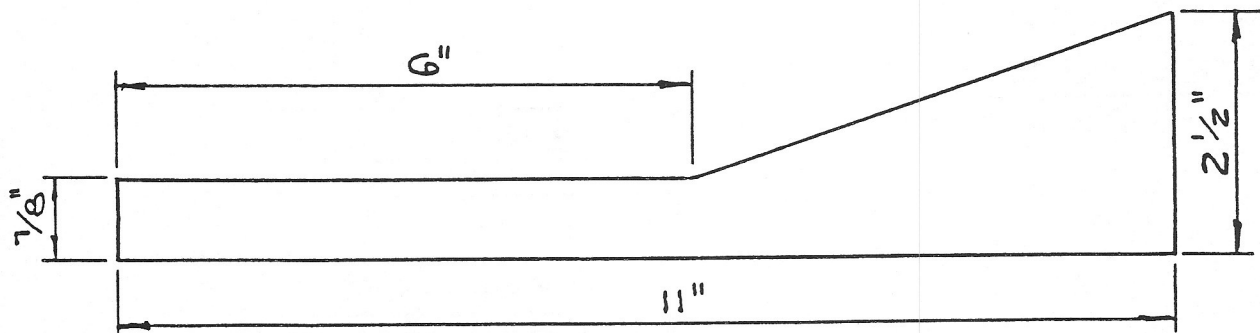
RIGHT END VIEW



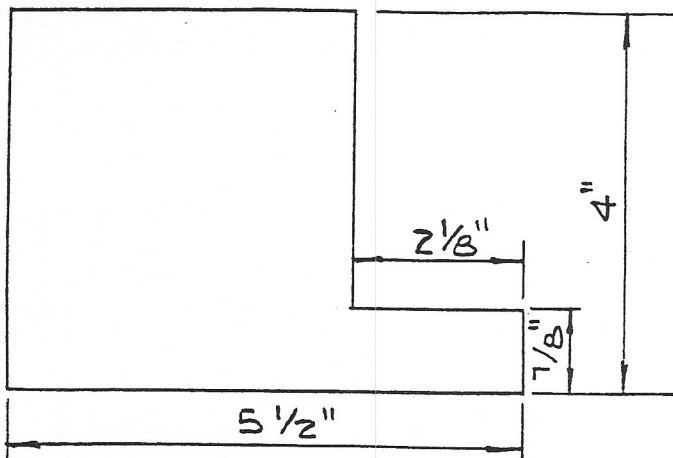
ITEM No. 1  
SIDE OF RAMP ROLL



ITEM No. 2  
MID-PIECE OF RAMP ROLL

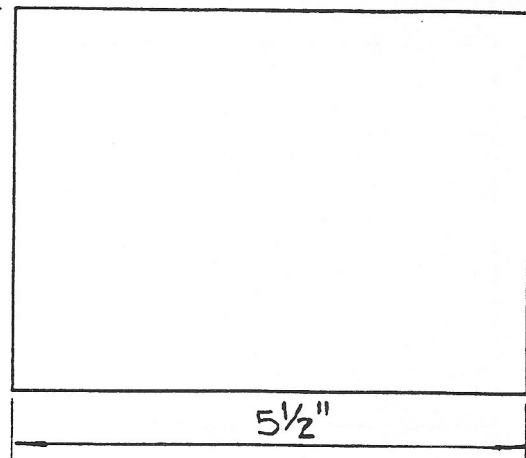


ITEM No. 3  
SIDE OF RAMP ROLL



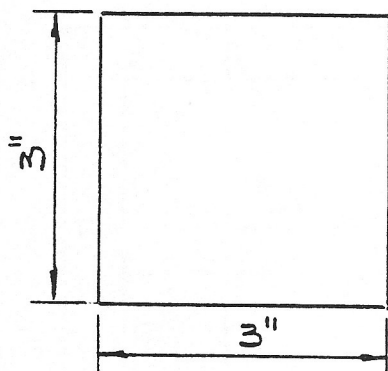
ITEM No. 4

LEFT END PIECE OF RAMP ROLL



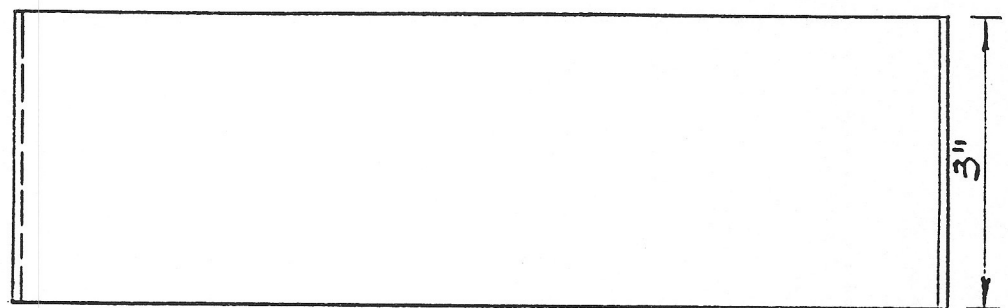
ITEM No. 5

RIGHT END PIECE OF RAMP ROLL



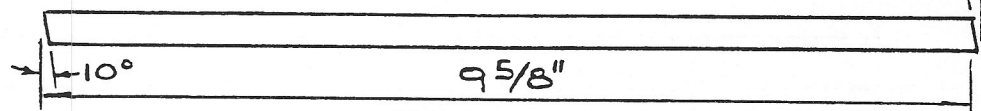
ITEM No. 7

CHOCK



TOP VIEW

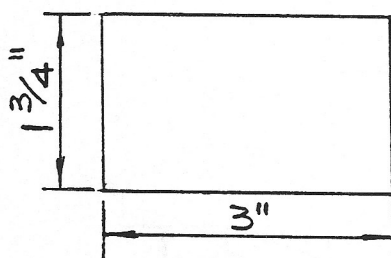
10°



FRONT VIEW

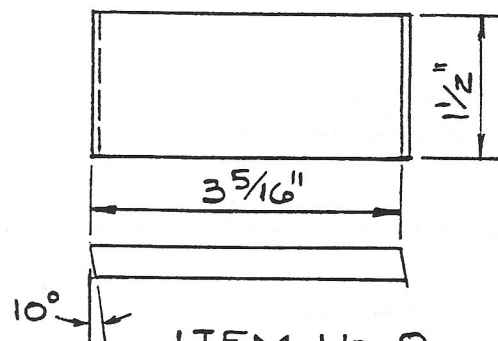
ITEM NO. 6

3" WIDE SLOPING PIECE



ITEM No. 8

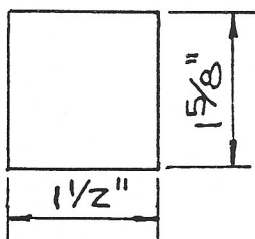
CHOCK



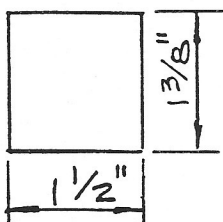
ITEM No. 9

TOP & FRONT VIEW  
OF 1/2" WIDE SLOPING PIECE

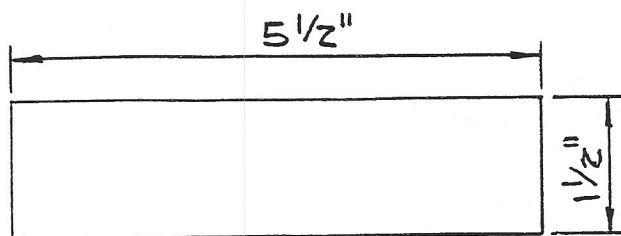




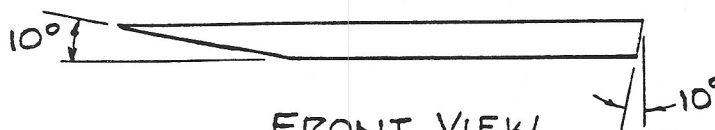
ITEM No. 10  
CHOCK



ITEM No. 12  
CHOCK

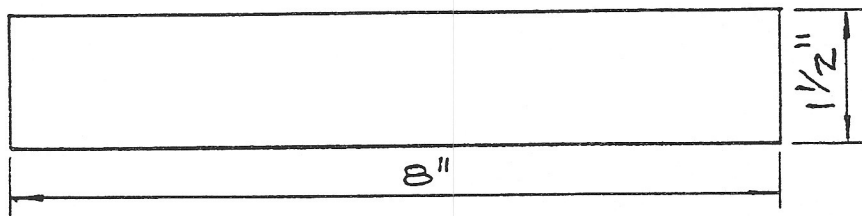


TOP VIEW

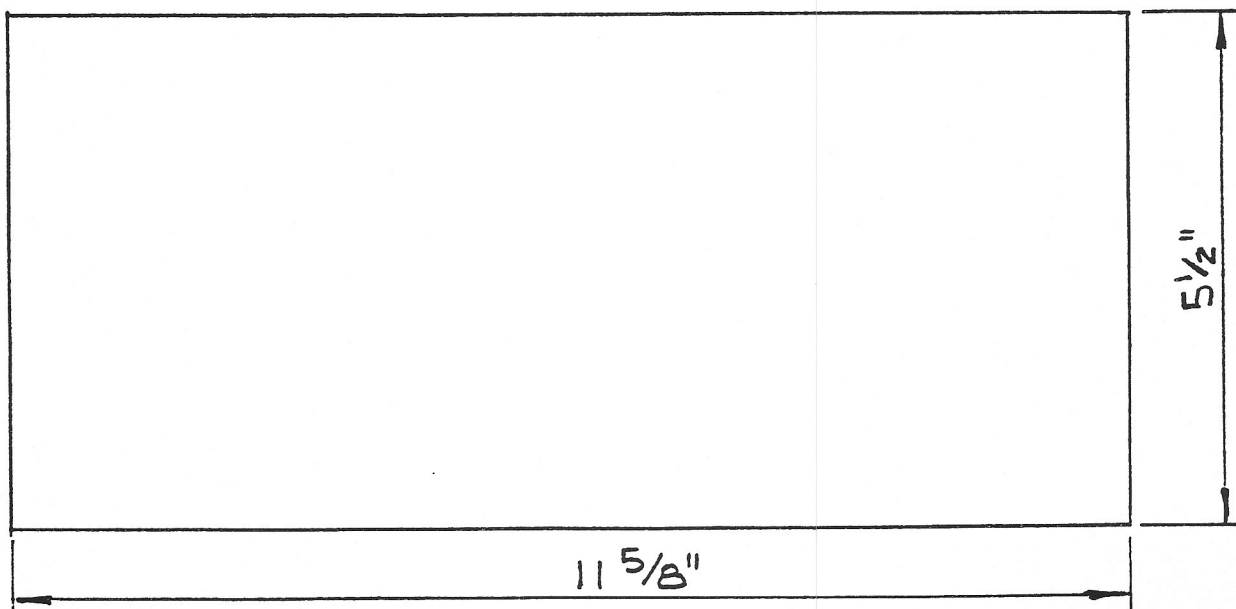


FRONT VIEW

ITEM No. 11  
 $1\frac{3}{8}$ " WIDE SLOPING PIECE



ITEM No. 13  
 $1\frac{3}{8}$ " WIDE STRAIGHT PIECE



ITEM No. 14  
BOTTOM OF RAMP ROLL



The Story Board is a wonderful toy which encourages a child's language and creativity. The large picture cards are easily manipulated as well as being clearly visible. Large, interesting pictures should be glued to the Masonite and sprayed with varnish.

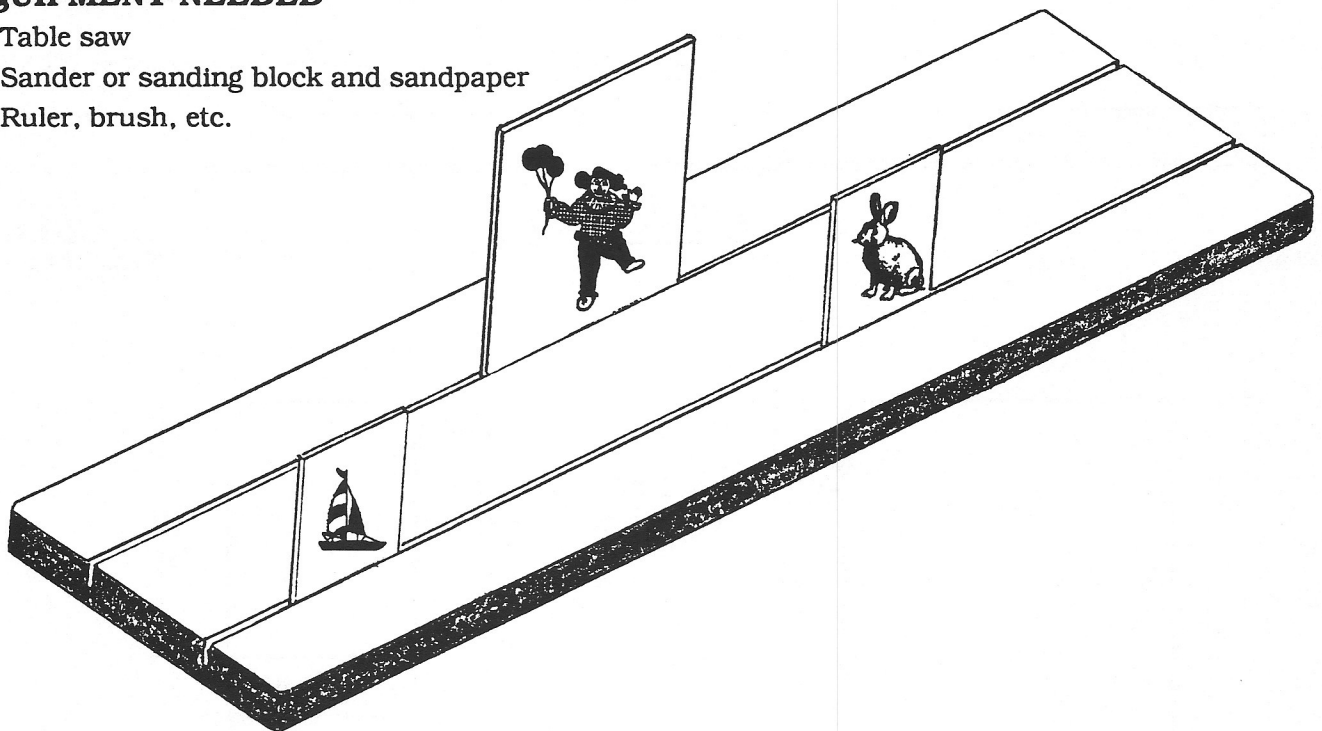
Providing about ten large Masonite picture boards and twenty small Masonite boards will offer a child variety but the number of pictures is unlimited.

**MATERIALS NEEDED**

- One 24" x 7" piece of 3/4" birch plywood
- One 24" x 24" piece of 1/8" tempered Masonite
- Gloss Varathane, or equal, varnish
- Non-skid material for bottom of board
- Contact cement for the non-skid material
- Pictures from magazines, decks of cards, Peabody or other learning cards, flash cards or photographs of favorite people
- Elmer's Carpenter's Glue

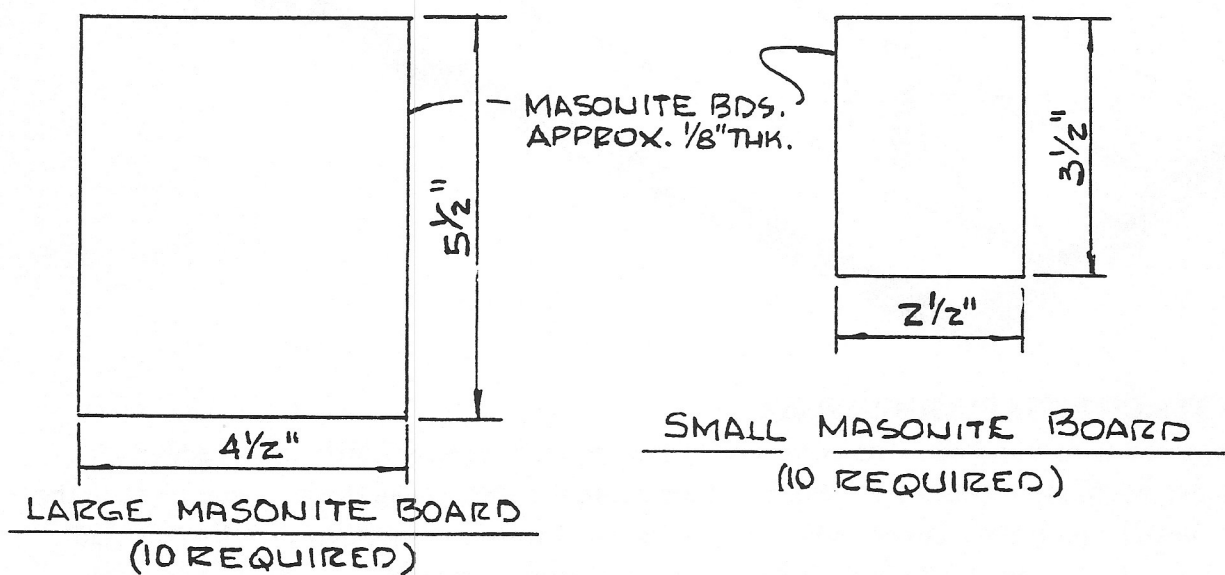
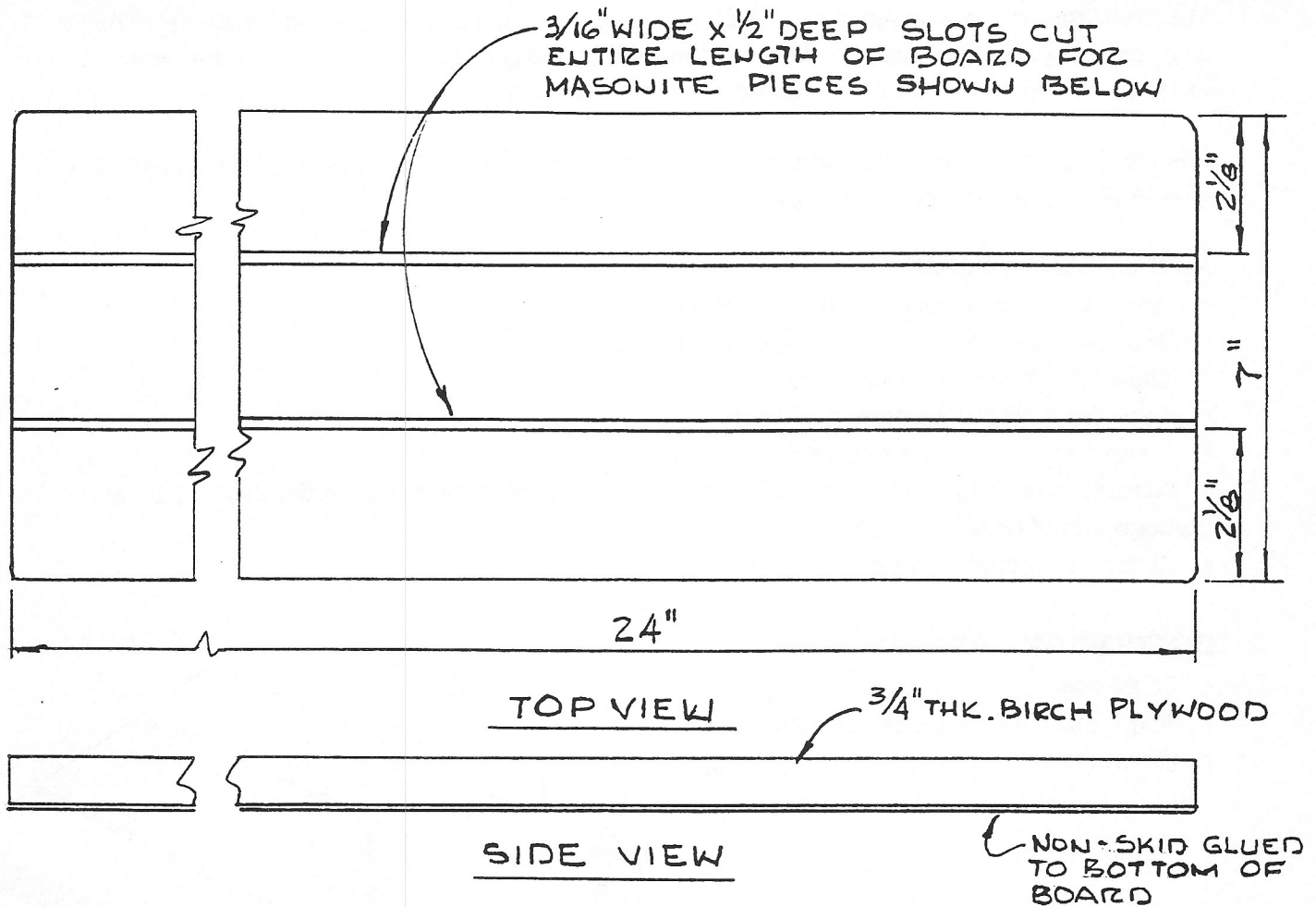
**EQUIPMENT NEEDED**

- Table saw
- Sander or sanding block and sandpaper
- Ruler, brush, etc.

**CONSTRUCTION SUGGESTIONS**

Cut plywood to size and cut slots according to the drawing. Sand smooth, round edges, etc. Cut Masonite to size. Slightly bevel edges of Masonite pieces to make them easy to place in the slots. Varnish all two coats both sides. When dry, sand with fine sandpaper. Affix non-skid material on the bottom of the board with two coats of contact cement on both the board and the non-skid material. Affix the pictures on the Masonite pieces with Carpenter's Glue. Spray the glued pictures with a light coat of varnish.



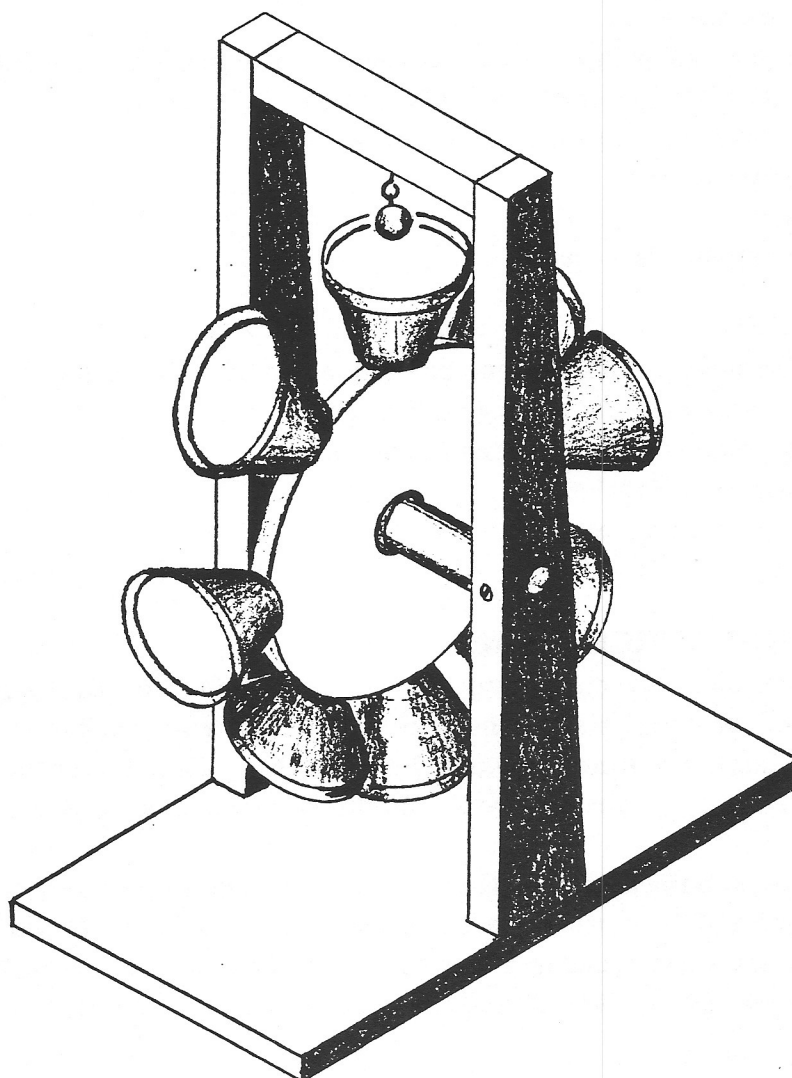


STORY BOARD PARTS

When the plastic or metal bell breaks off of a commercially made toy, what is left doesn't work as designed anymore. However, the bells are usually in excellent condition, and can be made into a Bell Wheel toy as described here.

Many children enjoy the tonal quality of bells. Some children, however, may not be able to hold the mallet of conventional bells to produce the sound. This bell wheel has been very successfully used with many of our Lekotek families as it does not require a mallet to make the bells ring. It has its own "mallet", a wooden ball which dangles from the top and hits the bells as they spin. In this way, a child can, with the slightest movement, spin the bells to begin the sound. The bells will rock back and forth for a while before requiring reactivation, so the child's efforts are rewarded.

The Bell Wheel is not only simple to make, it is also fun for the maker. The resulting toy is sturdy and colorful.



**MATERIALS NEEDED**

- The bells from a commercially made toy, such as "Round Bell" or "Spinning Rainbow." The dimensions given here are for the larger of the two toys, "Round Bell." If smaller bells are used, you will need to adjust the dimensions.
- One piece of 12" x 7" x 1/2" birch plywood
- Two pieces of 3/4" x 2 1/8" plywood tapered to 1/2" x 1 1/8"
- One piece of 3/4" x 1/2" x 5 1/2" plywood
- One piece of 1/2" birch plywood for circle 6 1/4" in diameter
- One 3/8" diameter x 7" long dowel
- Two pieces of 1/2" (inside diameter) PVC pipe 2 1/2" long
- One SKF bearing #1604 DS-TNT 608 "NICE" - 7/8" OD x 3/8" ID from Berry Bearing Co. (See Some Sources of Specialty Items at the bottom of the Table of Contents.)
- Non-skid material or rubber pads for the bottom
- Eight #4 1 1/2" Phillips head wood screws
- One "S" hook, size #813, for larger bells or two "S" hooks for smaller bells
- Two screw eyes, size #114
- One 7/8" wooden ball obtained from local source or from Cherry Tree Toys, Inc. (See Some Sources of Specialty Items at the bottom of the Table of Contents.)
- Eight #8 x 1" long flat head sheet metal screws
- Sixteen flat #10 washers
- Contact cement
- Varathane, or equal, gloss enamel

**TOOLS NEEDED**

- Table saw (The taper attachment can be used to saw the tapered pieces.)
- A band saw or saber saw for cutting out the wheel
- A sander is helpful but hand sanding will do nicely
- Power drill and set of drill bits
- Paint brush, screwdriver, etc.
- Long-nose pliers

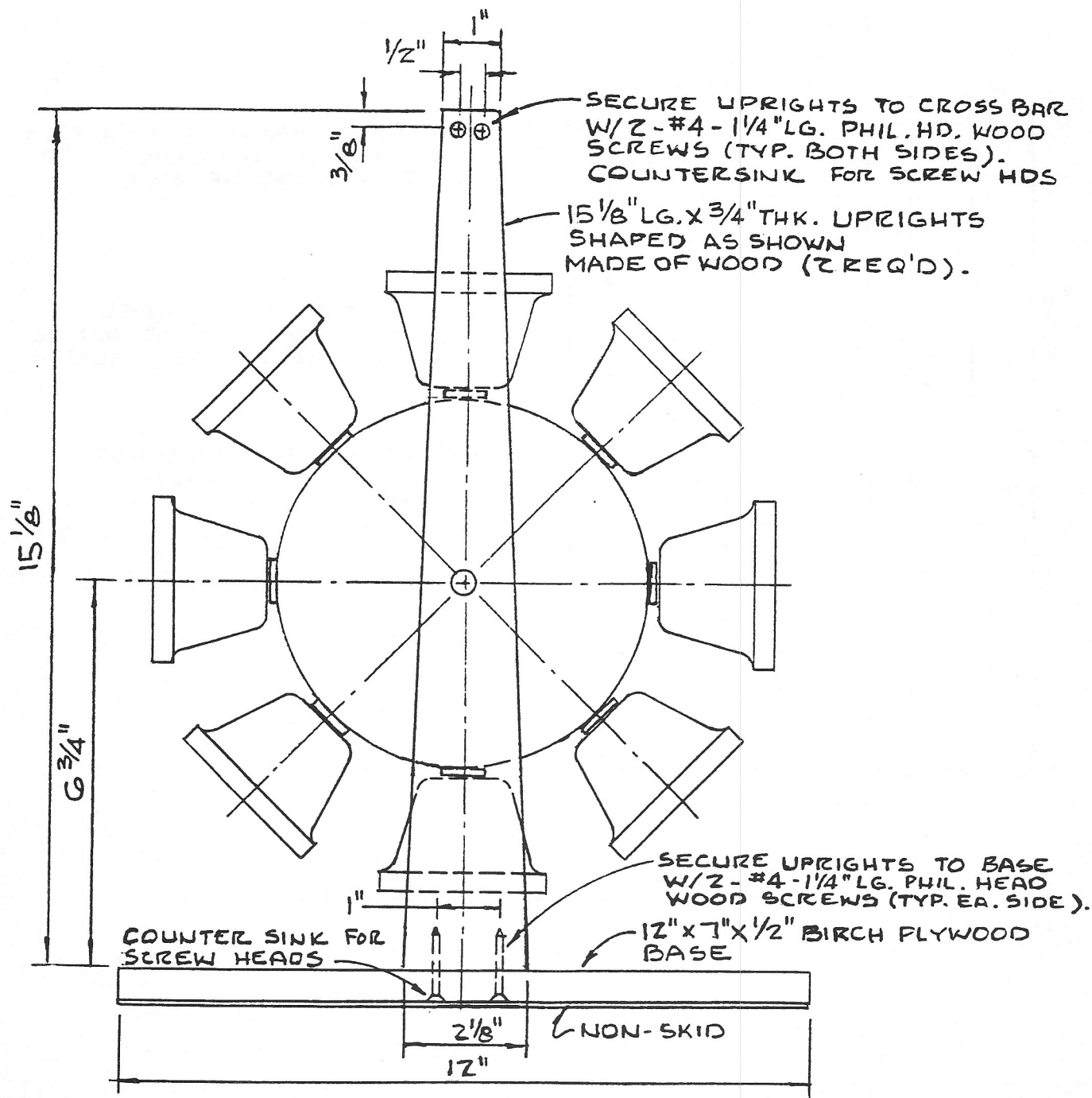
**CONSTRUCTION SUGGESTIONS**

Cut out the pieces as shown on the drawings and sand each piece. Drill and countersink the holes for screws. Drill the holes for the wheel axle dowel. Mark the location for the bells on the wheel according to the Front View of Bell Wheel. Drill pilot holes for the #8 screws that will hold the bells. Paint the frame and the wheel with two coats of enamel.

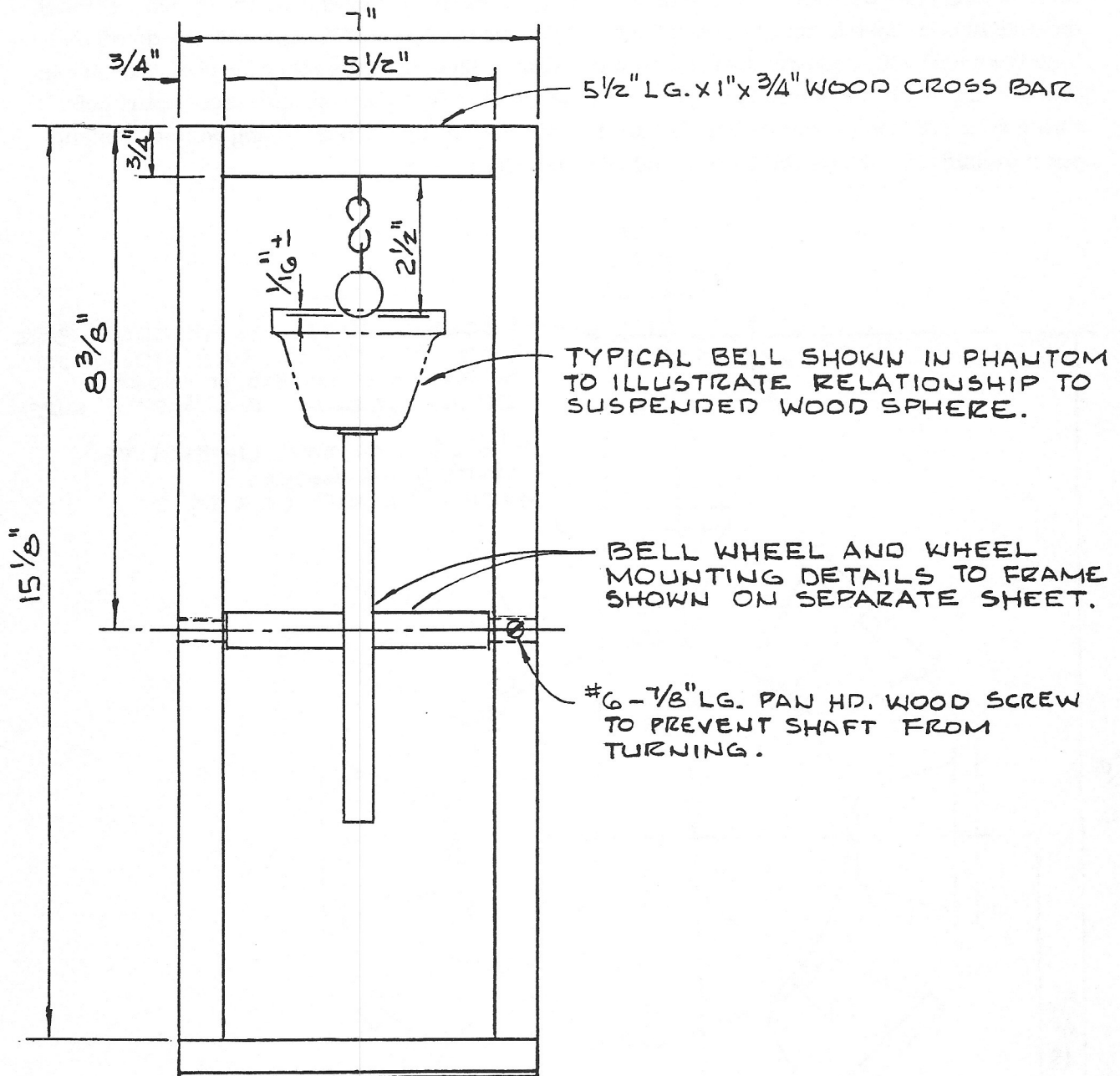
Insert the bearing into the bearing hole in the wheel making sure of a really tight fit. Assemble the wheels, in order of the music scale, as shown in Detail No. 2. Drill tiny pilot holes in the cross bar and in the wooden ball and insert the screw eyes in each. Using long nose pliers, open up each screw eye, slip the "S" hook on, and close each screw eye.



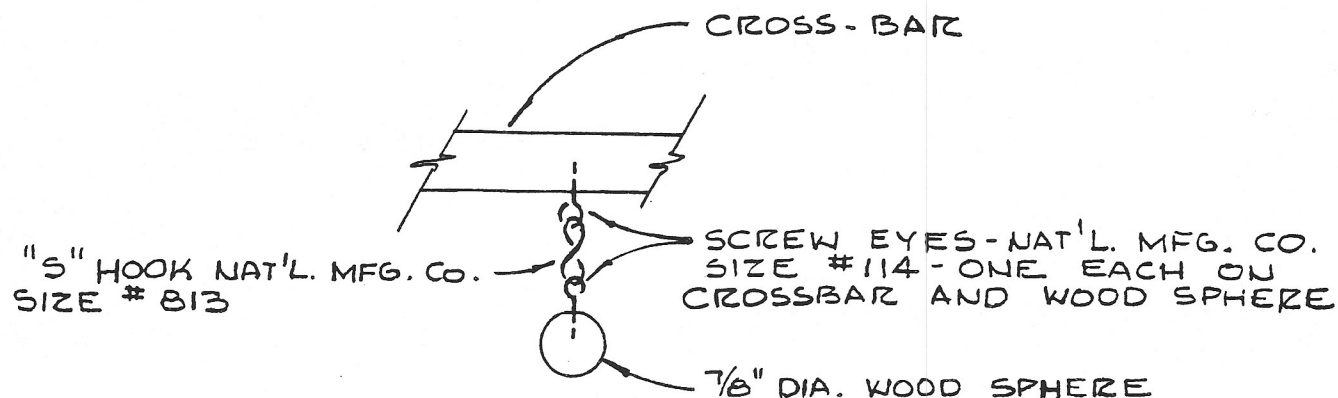
Cut the PVC pipe to length. Cut the dowel to length. Push the dowel from the outside, through the hole in one tapered upright about 2 1/2". Slip one section of PVC pipe over the dowel and then the wheel with bells and bearing onto the dowel. Then hold the other piece of PVC pipe in position and push the dowel through and into the hole in the other upright. Secure the dowel with a #6 x 7/8" long screw as detailed on the Side View of Bell Wheel. Using contact cement, put non-skid material on the bottom and trim the edges.



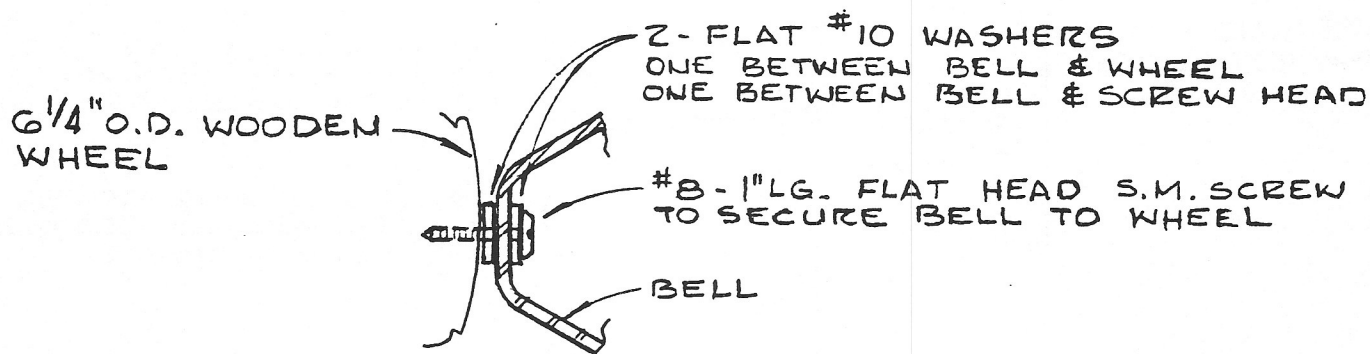
FRONT VIEW OF BELL WHEEL



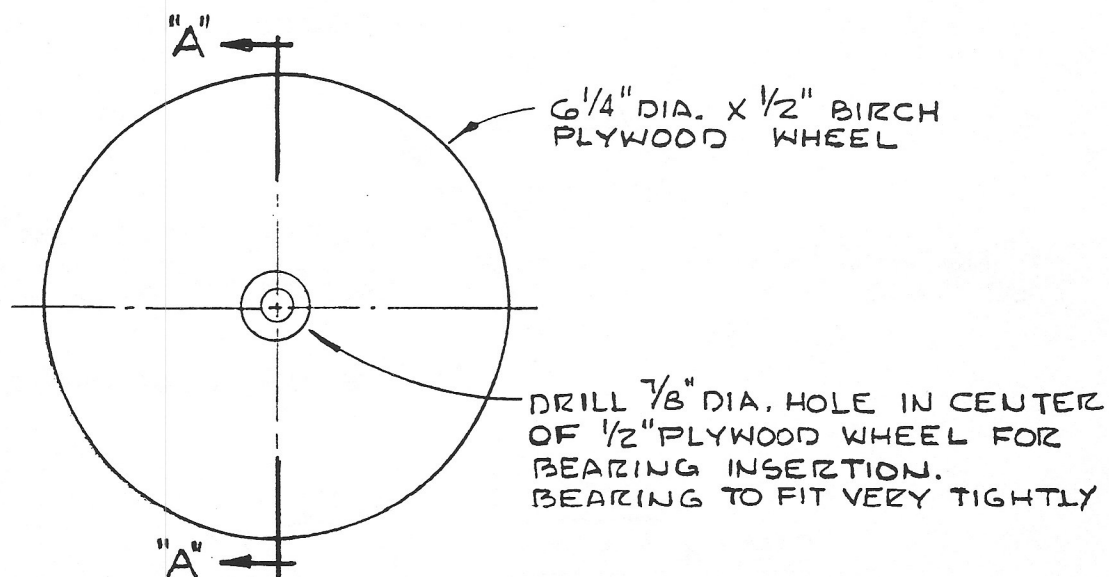
SIDE VIEW OF BELL WHEEL



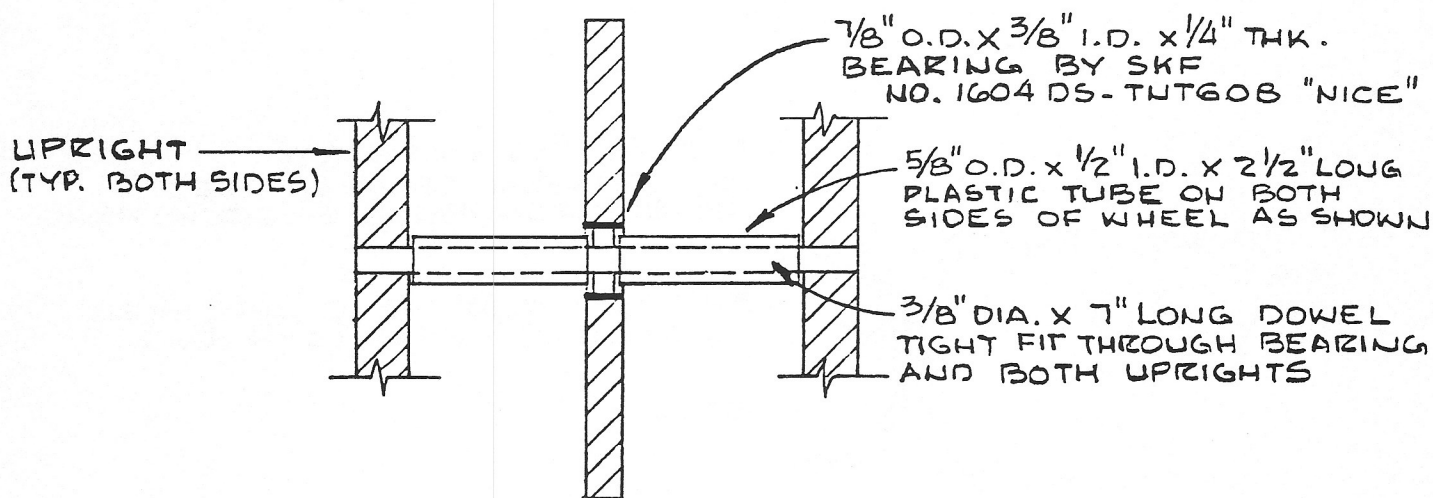
DETAIL No. 1  
CHAIN DETAIL SHOWING  
ATTACHMENT OF BALL TO CROSS-BAR



DETAIL No. 2  
ATTACHMENT OF BELL TO  
PLYWOOD WHEEL



BELL ATTACHMENT WHEEL



SECTION "A-A"

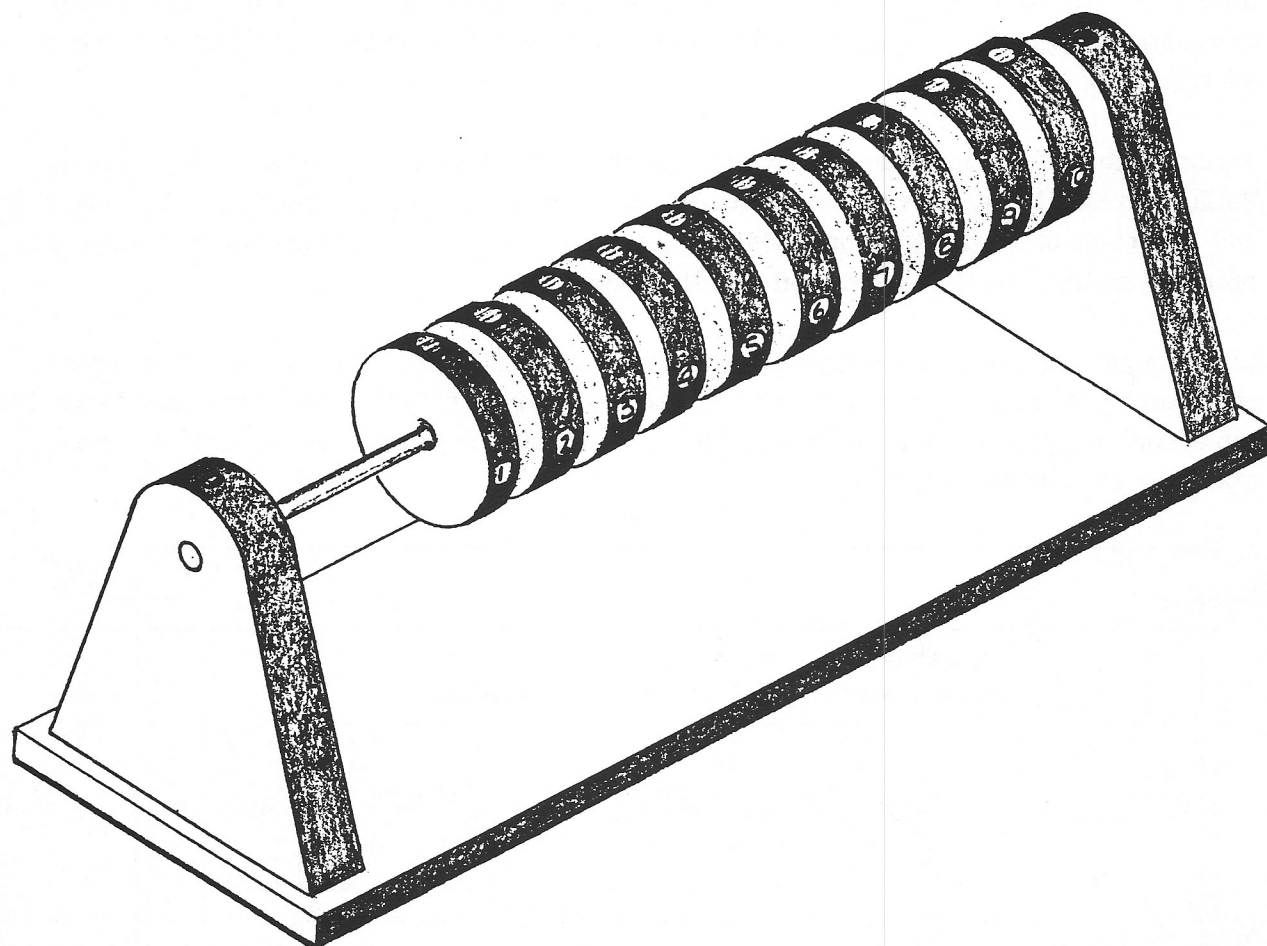
DETAILS SHOWING WHEEL MOUNTING  
TO TOY FRAME



This Counting Toy makes counting a concrete, visible activity. The numbers should be arranged left to right as in reading, or from right to left as they show up on a hand held calculator. This toy can even be numbered to teach the multiplication tables. It can fit many needs.

**MATERIALS NEEDED**

- One 15" x 5" piece of 3/8" birch plywood
- Two 4 3/8" x 4 1/2" pieces of 3/4" birch plywood
- One 14 3/4" x 3/8" diameter birch dowel
- Ten flat wheels 2 1/4" diameter available from Cherry Tree Toy (See Some Sources of Specialty Items at bottom of Table of Contents.)
- Ten flat wheels 1" in diameter (See Some Sources of Specialty Items as above.)
- Six #6 1" flathead Phillips screws
- Non-skid material and contact cement to bond to bottom
- A package of 1/2" diameter Avery self-adhesive removable labels, #R-808
- Elmer's Carpenter's Glue
- Varathane, or equal, spray paint in two colors and gloss varnish



**TOOLS NEEDED**

- Table saw
- Drill press or power drill
- Set of drill bits
- Large arc-joint pliers for holding flat wheels when enlarging the center holes
- Folding rule, pencils, brushes, miscellaneous small clamps

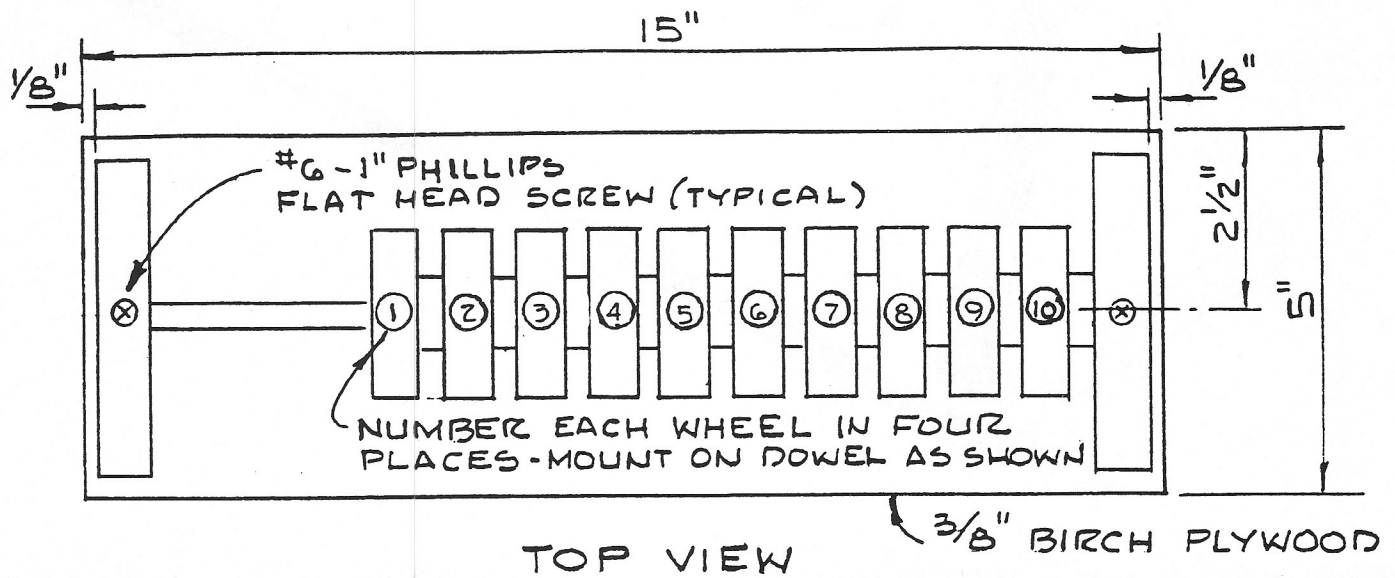
**CONSTRUCTION SUGGESTIONS**

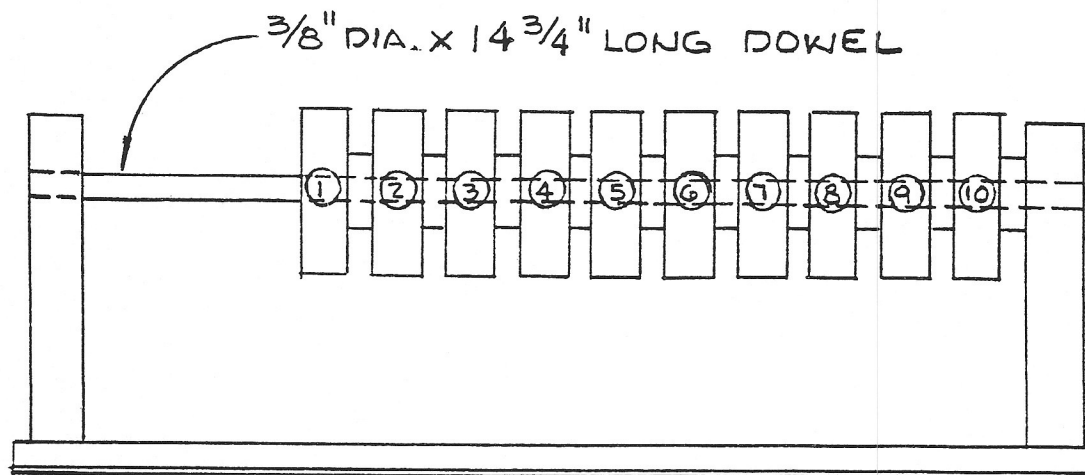
Cut out the 15" x 15" base piece. Cut out the side supports and drill the holes for the  $\frac{3}{8}$ " dowel. Sand the three pieces smooth, rounding the corners. Use a  $\frac{7}{16}$ " drill bit to enlarge the holes in all the flat wheels. Put glue on one surface of a 1" flat wheel and on a  $2\frac{1}{4}$ " flat wheel using a scrap piece of  $\frac{3}{8}$ " dowel a little over 1" long to center the two flat wheels. Clamp the two flat wheels together until the glue sets enough to hold firm. Repeat for all the flat wheels.

Make four marks equidistant apart on the flat edge of the large flat wheels. Stick a  $\frac{1}{2}$ " diameter self-adhesive label over each mark and roll on tightly. Spray the wheels a bright color on both sides. When totally dry, carefully peel off the labels. Use a felt-tip pen to mark one number in the four blank areas on the wheel. Mark all wheels with numbers in this manner, then spray the numbered wheels lightly with varnish. Varnish the  $14\frac{3}{4}$ " x  $\frac{3}{8}$ " dowel and sand smooth.

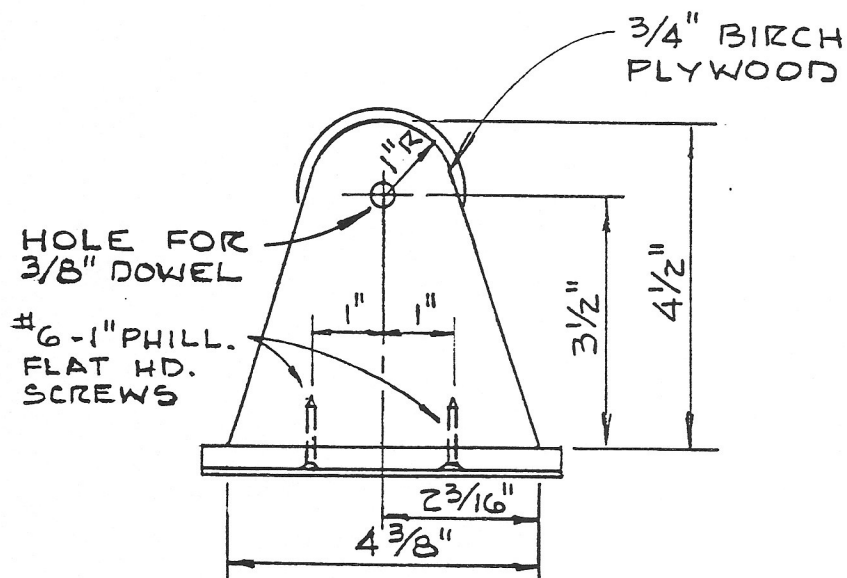
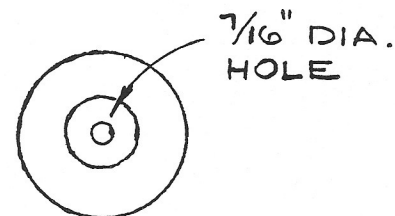
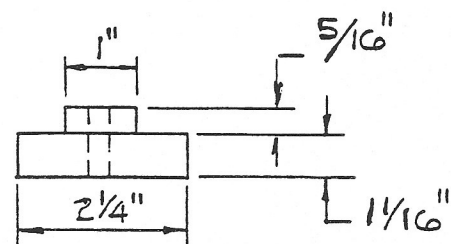
Assemble the side supports as described in the Side View drawing, using two 1" #6 flat head Phillips screws through the bottom piece and into each side support. Spray paint the assembly with two coats of a color that contrasts with that of the flat wheels. Using contact cement, put non-skid material on the bottom and trim the edges.

Slide the dowel through one support hole and put on the flat wheel sets in numerical order as was planned, then slide the dowel into the other support hole. Drill a small hole down from the top of each support and into the dowel. Use a countersink to provide for the flathead screw, and drive a screw into each hole.



FRONT VIEW

COVER UNDERSIDE  
WITH NON-SKID  
MATERIAL

SIDE VIEWTOP VIEWSIDE VIEW

WOODEN WHEEL DETAIL  
(10 REQ'D)



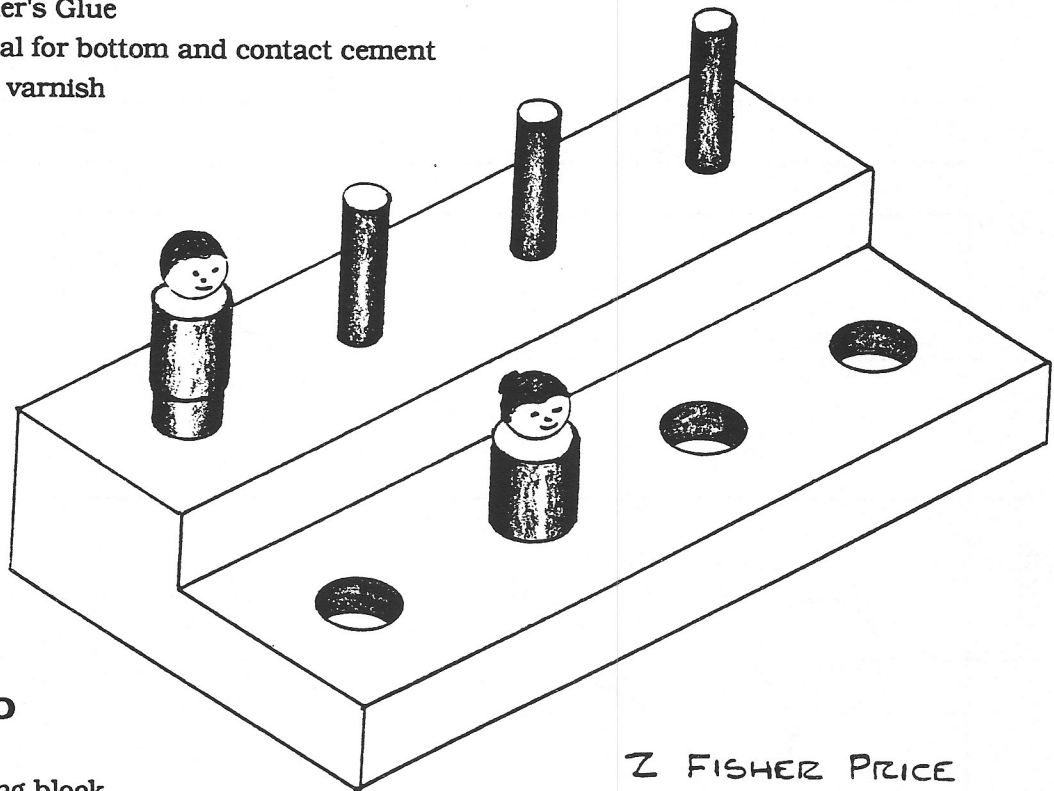


This is a simple toy that uses imaginary play to encourage a child's fine motor skills such as pincer grasp and eye-hand coordination. It is a toy which a child can easily approach and find success. The figures are colorful and the action produces immediate results.

The toy requires only minimum skill to make and certainly will last a long time. The body of this toy is best made of birch plywood in whatever thicknesses are readily available to the maker. The height dimensions are not critical but those shown result in a very usable toy. Keep the width and length dimensions as shown. Small "people" such as are provided with many Fisher-Price toys fit the dowel dimensions and hole sizes. Simple wooden pegs could also be drilled to slip over the pegs and sized to fit into the holes. Paint the pegs to resemble people.

**MATERIALS NEEDED**

- One 8" x 4 1/4" piece of 1" birch plywood
- One 8" x 4 1/4" piece of 3/4" birch plywood
- 4 - 7/16" diameter x 1 7/16" long dowels
- Four different Fisher-Price "people" for each toy, part #4-0141 at \$.85 each from the Fisher-Price "Bits and Pieces" catalog. Order a few spares as well. (See Some Sources of Specialty Items at bottom of Table of Contents.)
- Elmer's Carpenter's Glue
- Non-skid material for bottom and contact cement
- Varathane gloss varnish

**TOOLS NEEDED**

- Table saw
- Sander or sanding block
- Expansive drill bit
- Brace
- 7/16" drill bit
- Vice, ruler, varnish brush, etc.

Z FISHER PRICE  
FIGURES SHOWN

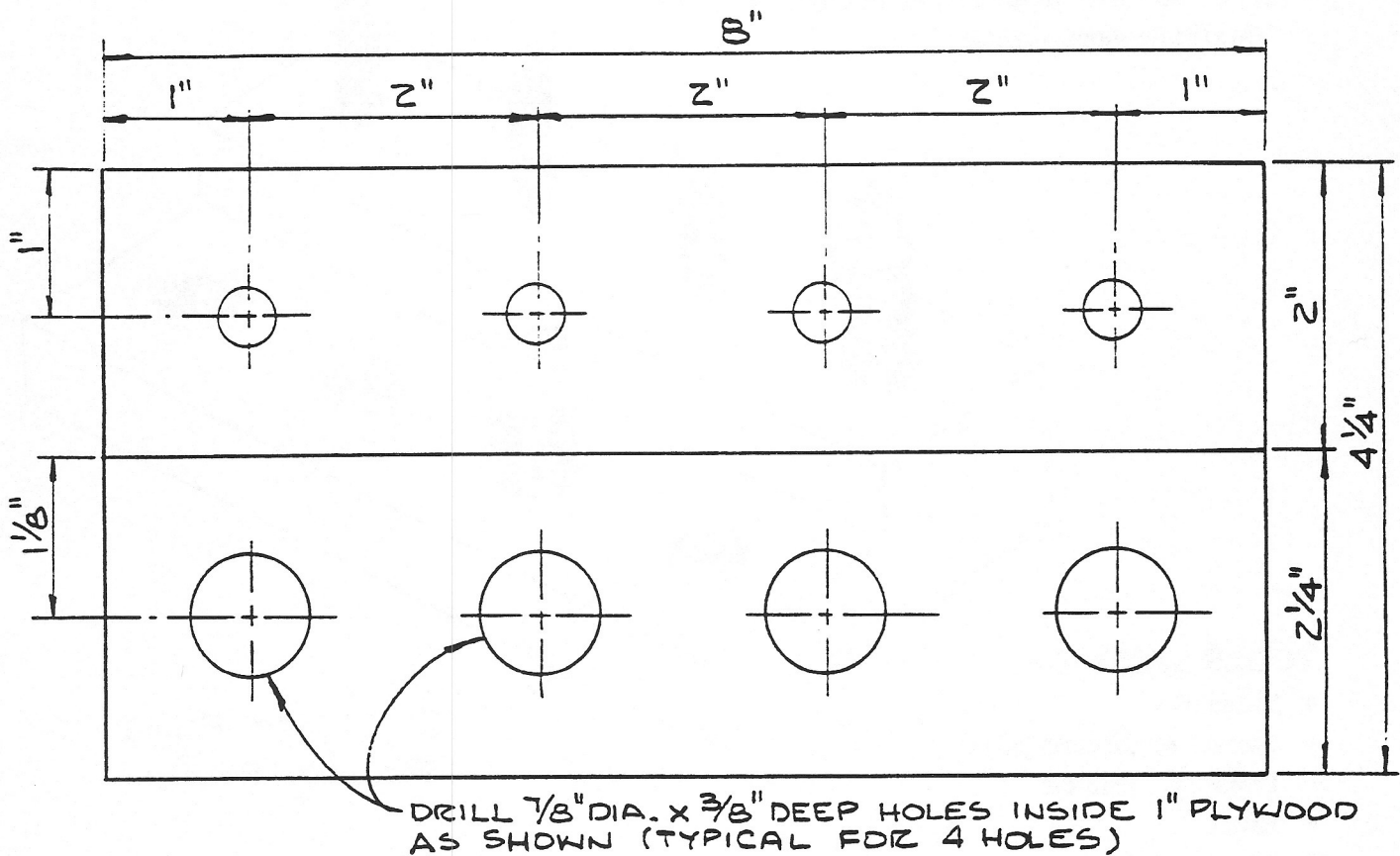
**CONSTRUCTION SUGGESTIONS**

From the one piece of  $\frac{3}{8}$ " birch plywood, cut out three pieces  $8" \times 4\frac{1}{4}"$  and glue them together. To keep the pieces from sliding on each other during the clamping operation, drive two 1" #16 nails through the pile from what will be the bottom in the area where the  $8" \times 2"$  pieces will be glued later.

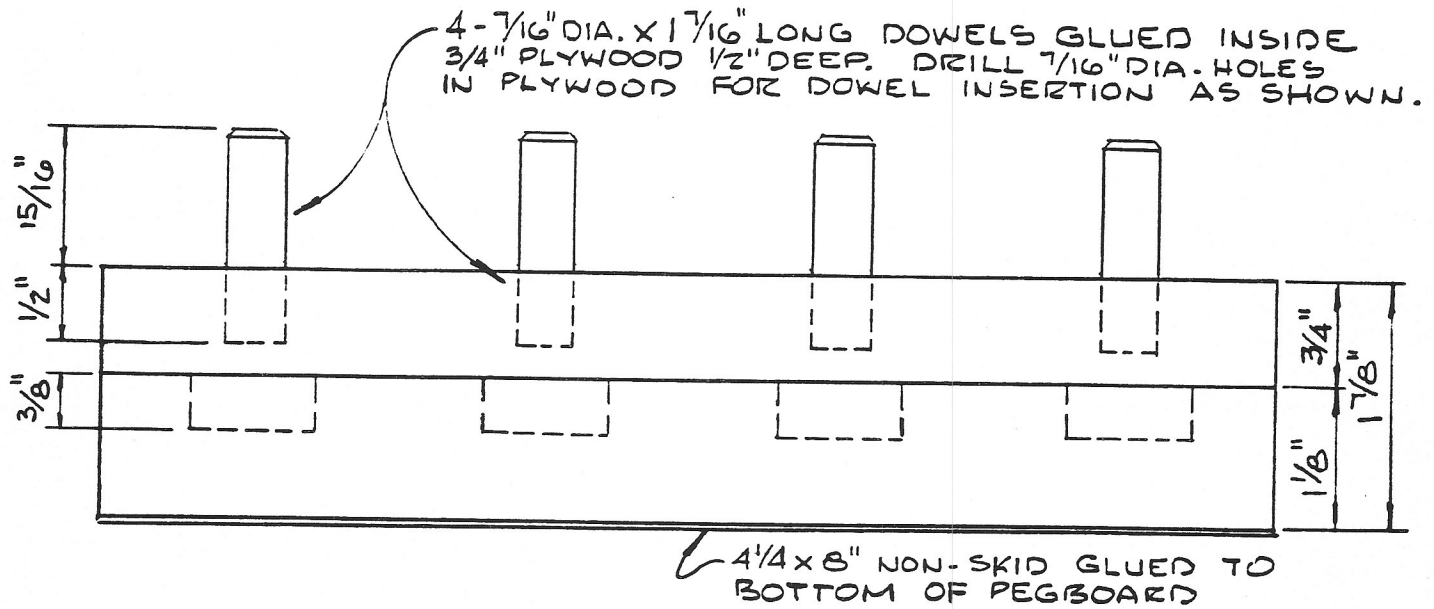
After the glue has set in about a half hour, cut out the two  $8" \times 2"$  pieces and spread glue on the bottom and top of one piece. Put this piece in place to start the step configuration shown in the perspective drawing. Now put the other piece on top and hold in place for clamping by nailing two 1" #16 nails part way down what will be the  $\frac{7}{16}$  dowel holes. Clamp together and when set, pull out the nails.

Locate the drill holes and drill holes of the diameters specified to the depths shown. See "Top View of In-On Pegboard" and "Front View of In-On Pegboard." Sand the sides and tops carefully.

Cut the  $\frac{7}{16}"$  dowel to four  $1\frac{5}{16}"$  lengths and slightly bevel both ends of each. Apple glue sparingly to each dowel and hammer them in place. Varnish with two coats of Varathane gloss varnish, sanding lightly after each coat.



TOP VIEW OF IN-ON PEGBOARD

FRONT VIEW OF IN-ON PEGBOARD

(FISHER PRICE FIGURES NOT SHOWN)

NOTE: PEGBOARD MATERIAL IS  
BIRCH PLYWOOD.



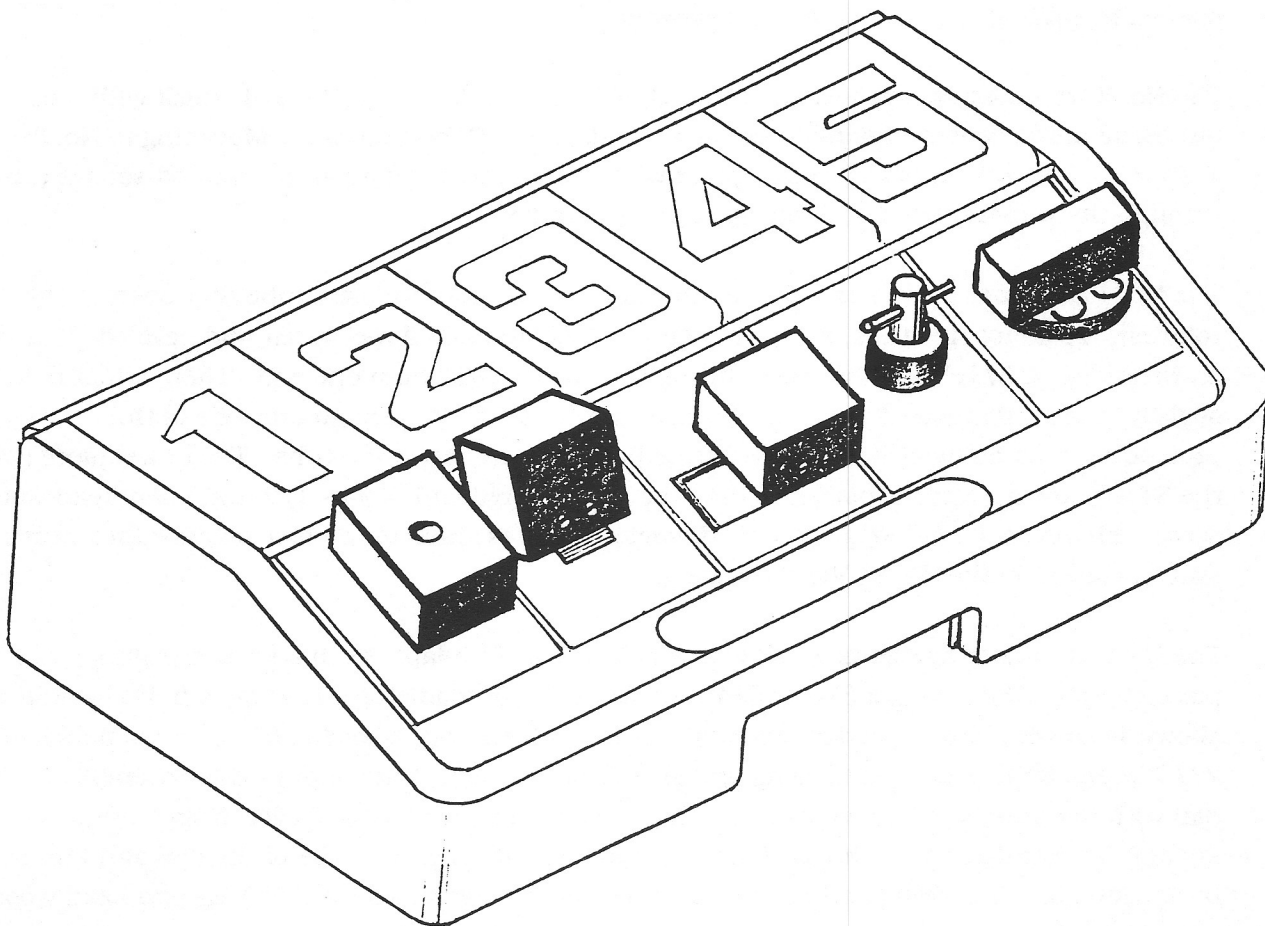


The Hasbro Busy Box has color, action, cause-and-effect and the surprise of finding a favorite friend by opening the right door. The five handles to be pushed, twisted or pulled are just too difficult for many children to grasp. By adapting the handles a bit, this toy can be more easily used by children who have special needs. Attaching the extensions and following the detailed drawings can be easily accomplished by the average handyman.

**MATERIALS NEEDED**

Almost any kind of close-grained wood can be used, preferably birch or maple. A harder wood, rather than soft pine, will work best.

- One 1 3/4" x 1 1/2" piece of 3/4" wood
- Two 1 1/2" x 1 1/2" piece of 3/4" wood
- One 3/4" x 2 3/4" piece of 3/4" wood
- Small amount of birch doweling of 3/16" dia. and 1/2" dia.
- One 1" #4 pan head screw
- Four 3/4" #4 pan head screws
- Three 1/2" #4 pan head screws
- Elmer's Carpenter's Glue
- Varathane spray enamel, or equal, in several bright colors



HANDLE EXTENSIONS HIGHLIGHTED

**TOOLS NEEDED**

- Table saw
- Vise and power drill or drill press
- Set of drill bits
- Hammer and chisel
- Screw driver
- Ruler, pencil

**CONSTRUCTION SUGGESTIONS**

The adapter for mounting on the No. 1 trap door opener is a wooden block 1 1/2" x 1 3/4" x 3/4" thick. A countersunk hole has to be drilled in the block shown as in the drawing, "Wood Block for Mounting to No. 1 Push-Button Trap Door". It is screwed in place on the Hasbro No. 1 push button using a #4 - 1" long pan head wood screw.

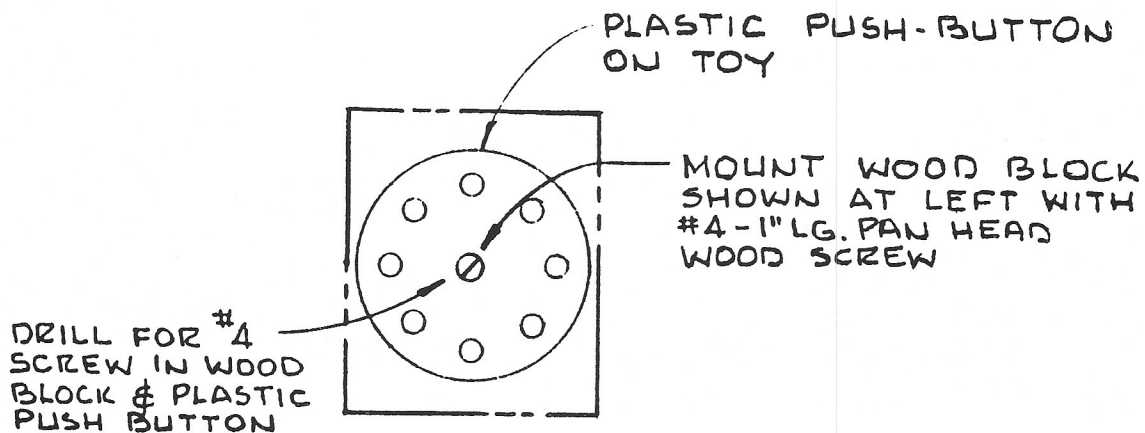
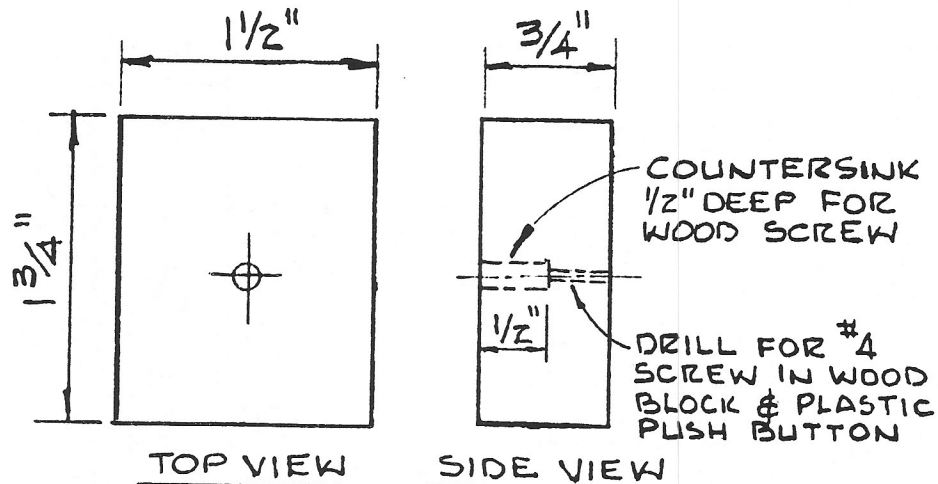
For the No. 2 trap door opener a 1 1/2" x 1 1/2" x 3/4" thick wooden block, beveled on the bottom side and with a 3/4" x 1/2" x 5/16" slot cut into the bevel, all as shown in the drawing for No. 2 trap door opener. It is screwed in place using a #4 - 3/4" long pan head screw according to the "Detail Showing Wood Block Mounting To Trap Door Opener". The trap door is opened by pulling the wooden block downward.

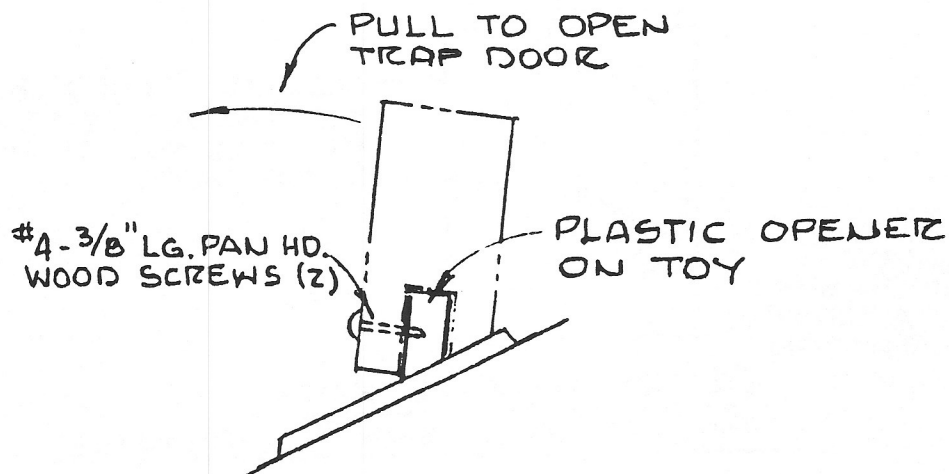
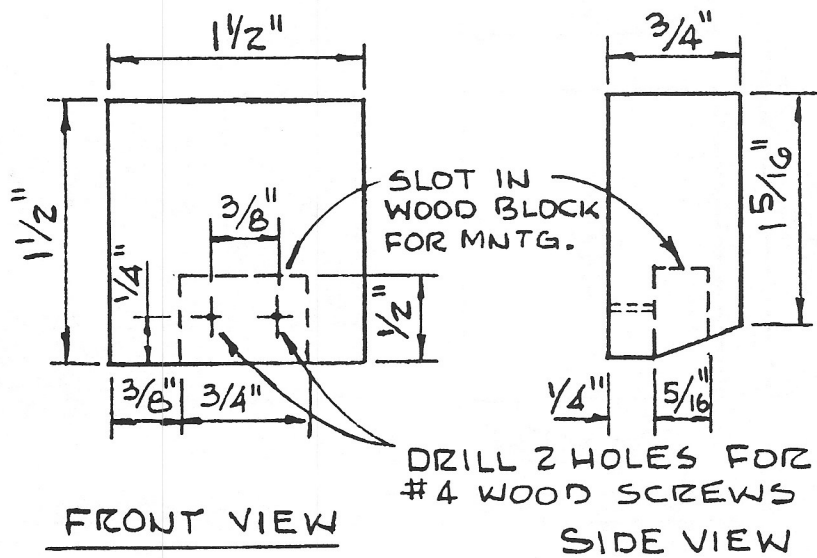
The No. 3 trap door opener is a simple block of wood 1 1/2" x 1 1/2" x 3/4" thick with a cut out made in the center-underside as shown in drawing, "Wood Block for Mounting to No. 3 Trap Door Opener". It is screwed in place with two #4 - 3/4" long pan head wood screws driven through the wooden block and into the Hasbro handle.

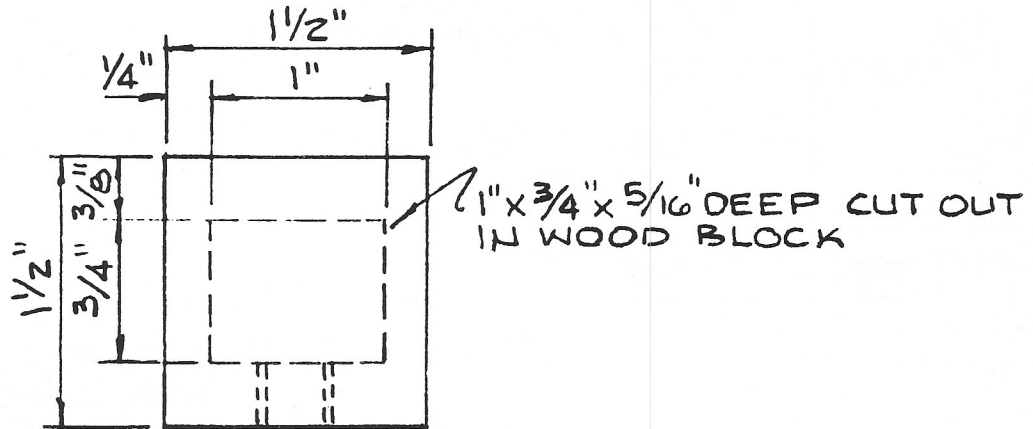
The No. 4 trap door opener on the Hasbro Busy Box is a short plastic tube that operates by rotation. To adapt this tube, a 1 1/4" length of 1/2" wooden dowel is cut and beveled slightly on the ends. A 3/16" hole is drilled through the dowel 3/8" from one end. Then a pilot hole of slightly smaller diameter than a #4 pan head screw is drilled through one side of the protruding tube half way between its inside base and the top of the tube. The dowel piece (with the 3/16" hole upward) is placed in the tube and secured with a #4 - 1/2" long pan head wood screw. Finally, a 1 3/4" long x 3 1/6" diameter dowel is glued in the hole as described above and as shown on the "Front View" drawing.

The No. 5 trap door opener is a dial with small holes. To adapt the dial for easier grasp, cut a piece of wood 2 3/8" long x 3/4" x 3/4". Drill two 7/16" diameter x 1/4" deep holes located as shown in the drawing, "Wooden Opening Device to Open Trap Door No. 5". Cut two pieces of 7/16" diameter dowels x 9/16" long and glue them in place. Then mount this assembly on the dial with the dowels in two opposite dial holes as shown in the "Top View". Using a drill of slightly smaller diameter than a #4 screw, drill a hole through the side of the dial and into one of the dowels. Then drill another into the other dowel. Screw a #4 - 1/2" long pan head wood screw into each hole, securing the adapter onto the dial.

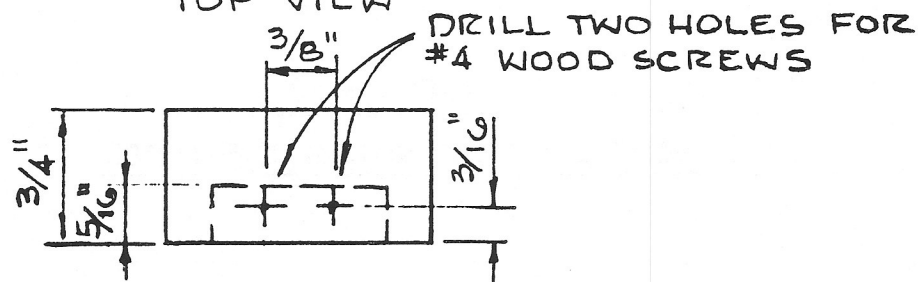
When the fitting is complete, remove the wooden adapter pieces by unscrewing them. Sand and paint two coats. Then remount the new handles and screw into place.

NO.1 PUSH-BUTTON TRAP DOOR OPENERDETAIL OF WOOD BLOCKMOUNTING (SHOWN IN PHANTOM)

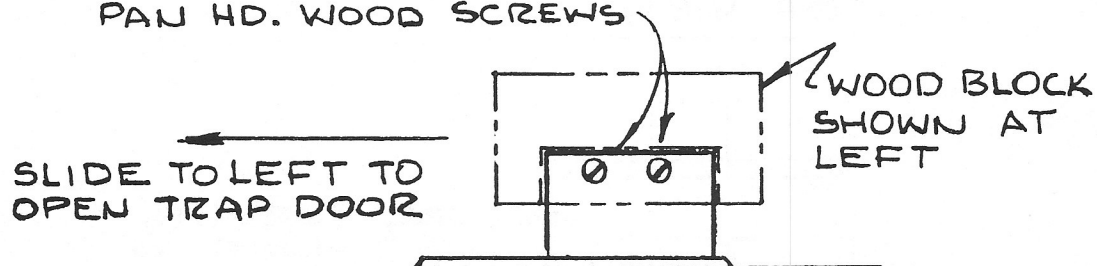
NO. 2 TRAP DOOR OPENERDETAIL SHOWING WOOD BLOCK  
MOUNTING TO TRAP DOOR OPENER

NO. 3 TRAP DOOR OPENER

TOP VIEW

FRONT VIEW

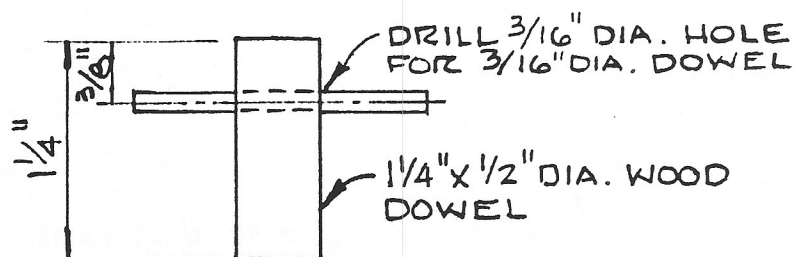
SECURE WOOD BLOCK TO PLASTIC  
TRAP DOOR OPENER W/2 -#4 - 3/4" LG  
PAN HD. WOOD SCREWS



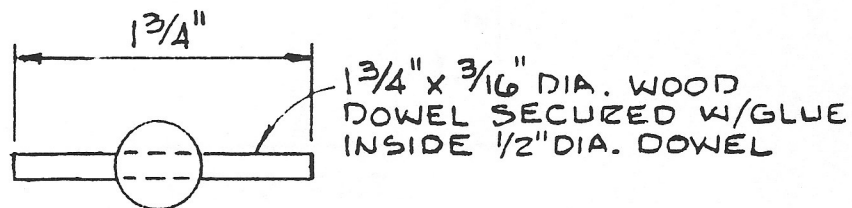
DETAIL SHOWING WOOD BLOCK  
MOUNTING TO TRAP DOOR  
OPENING DEVICE



TRAP DOOR NO. 4 OPENER

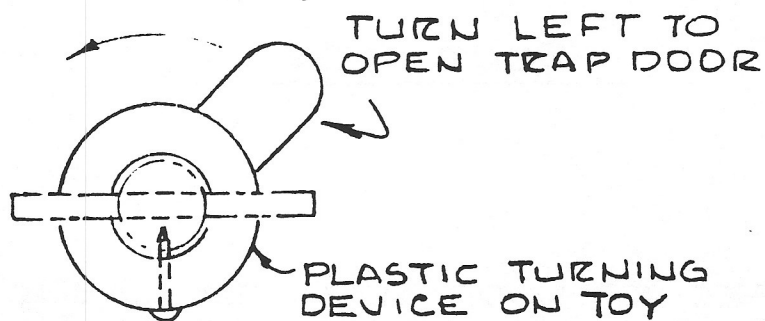


FRONT VIEW

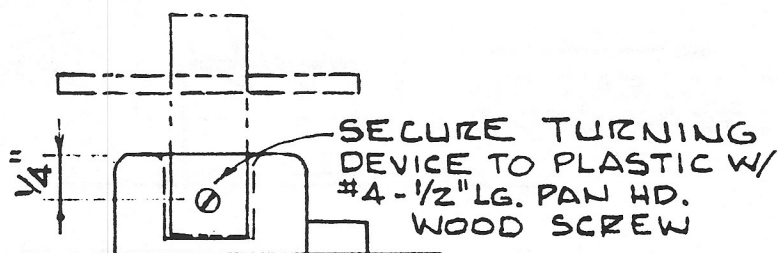


TOP VIEW

WOODEN TURNING DEVICE

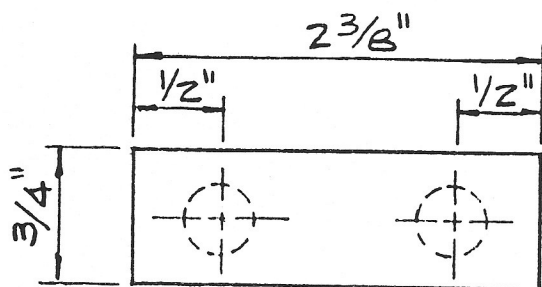


TOP VIEW

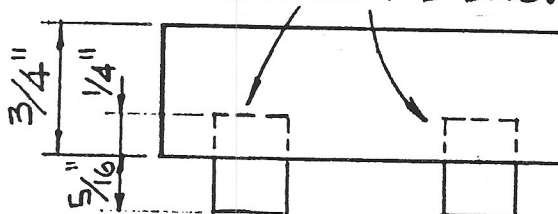
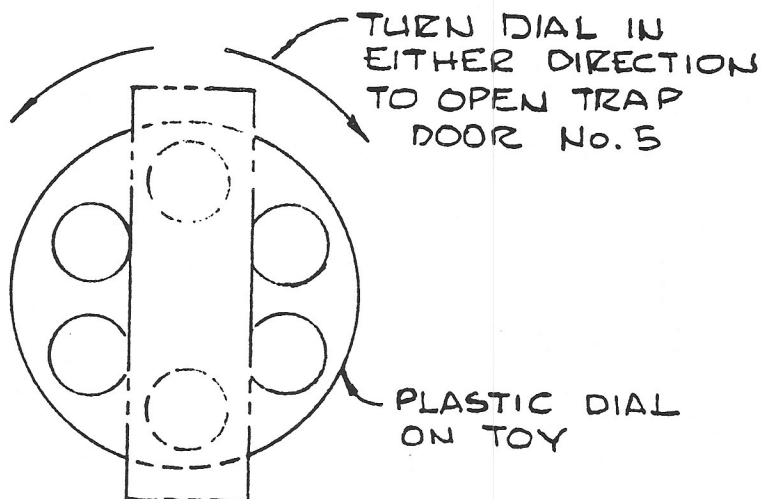
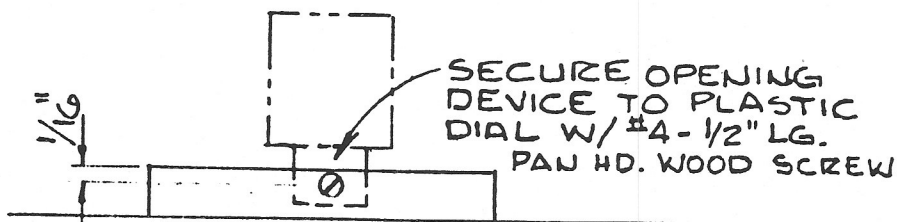


FRONT VIEW

DETAIL SHOWING WOOD TURNING  
DEVICE ATTACHMENT TO TOY

NO. 5 TRAP DOOR OPENERTOP VIEW

2 -  $\frac{7}{16}"$  DIA. X  $\frac{9}{16}"$  LG.  
DOWELS GLUED INTO  
WOOD BLOCK AS SHOWN

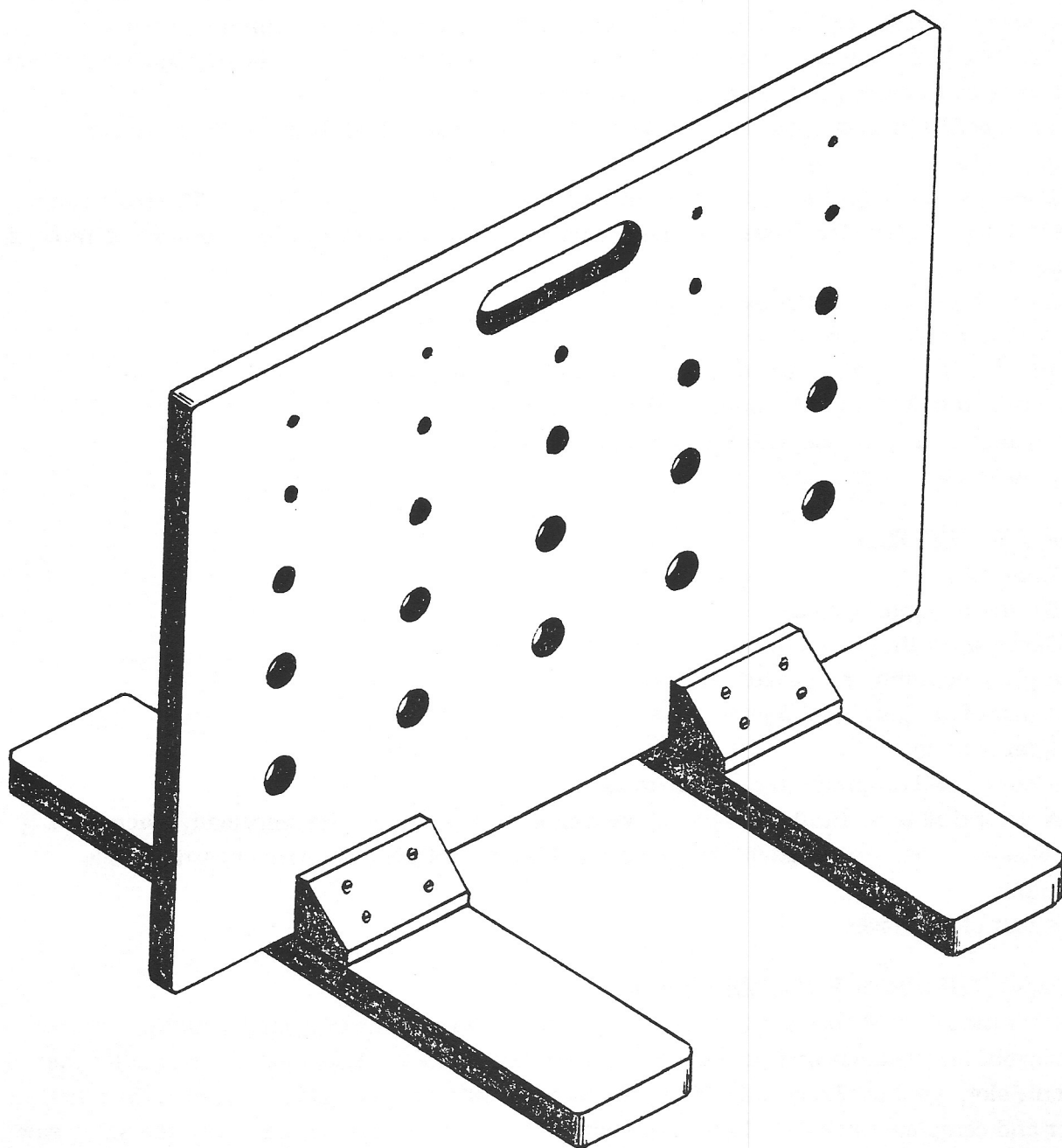
FRONT VIEWTOP VIEWSIDE VIEW

DETAIL SHOWING MOUNTING OF  
OPENING DEVICE TO DIAL



The String Puller offers the child tactile, cognitive and imaginary play opportunities and, as with the Clackin' Balls (#47), has the advantage of limiting the child's visual field to allow for easier focusing. The varied diameters and colors of the beads as well as the various textures of the strings or ropes provide the child with a variety of sensory experiences.

Imaginative narratives can be incorporated into play with this toy if another player sits on the opposite side of the board and pulls the strings from that side. Maybe the child can be the village hero when he or she pulls all the "people" (small, medium and large balls) to safety and they escape from the giant (a playmate) who prowls through the village on the other side of the wall. Let go a little; make it fun. Every child deserves to be a hero once in a while.



SHOWN WITHOUT STRINGS FOR CLARITY

The String Puller is not hard to make but the board layout work for the location of the holes is painstaking. Several steps in the directions may require the learning of new skills but they are not difficult to learn. These include cutting the "strings," drilling the holes in the wooden balls and gluing and nailing the strings in place.

### **MATERIALS NEEDED**

- One 20" x 14" piece of 3/8" birch plywood
- Two 16" x 3 1/4" pieces of 3/4" plywood for the support shoes
- 16 pieces of birch plywood 1 1/2" x 3/4" thick for the support braces. Scrap pieces will do. (See Detail No. 3.)

- Four feet each of five different diameter " strings" are needed. See drawing Section A-A.)

The "string" is really nylon cord or nylon rope. This can be obtained from most hardware stores. The larger diameter rope may be available only at a yacht or sailboat chandlery. Hemp rope may also be used but nylon is the preferred material.

- Ten wooden balls of each of the following diameters and colors: Red- 2"; Yellow-1 1/2"; green-1 1/4"
- Twenty wooden balls of 3/4" diameter, half in blue and half in uncolored. The balls can be ordered from Cherry Tree Toys, Inc. (See Some Sources of Specialty Items at bottom of Table of Contents.)
- A small roll of 1" wide masking tape
- Varathane gloss varnish, or equal
- 16 - 1 1/4" #6 Phillips flat head screws (four for each brace)
- Non-skid material for the bottoms the the supports
- Contact cement to use with the non-skid material
- Elmer's Carpenter's Glue

### **TOOLS NEEDED**

- Table saw
- Sander or sanding block
- Saber saw with fine teeth
- A propane torch or a gas kitchen range
- A pair of arc-joint or slip-joint pliers
- A razor knife
- A power drill or, preferably, a drill press
- A set of drill bits. Brad point bits make cleaner edges of the holes, especially when drilling the wooden balls. An expansive bit and a hand brace for the larger string board holes is desirable.
- A pair of old gloves

### **CONSTRUCTION SUGGESTIONS**

Cut out the 20" x 14" piece of 3/8" birch plywood. Following the drawing Detail No. 1, make the layout for the holes and note the size of each line of holes. Also make the layout for the handle slot. Drill the holes only 3/4 of the way through from one side, then turn the piece over and complete the holes. This avoids tearing the wood on the bottom. Use the saber saw to cut out the handle slot.

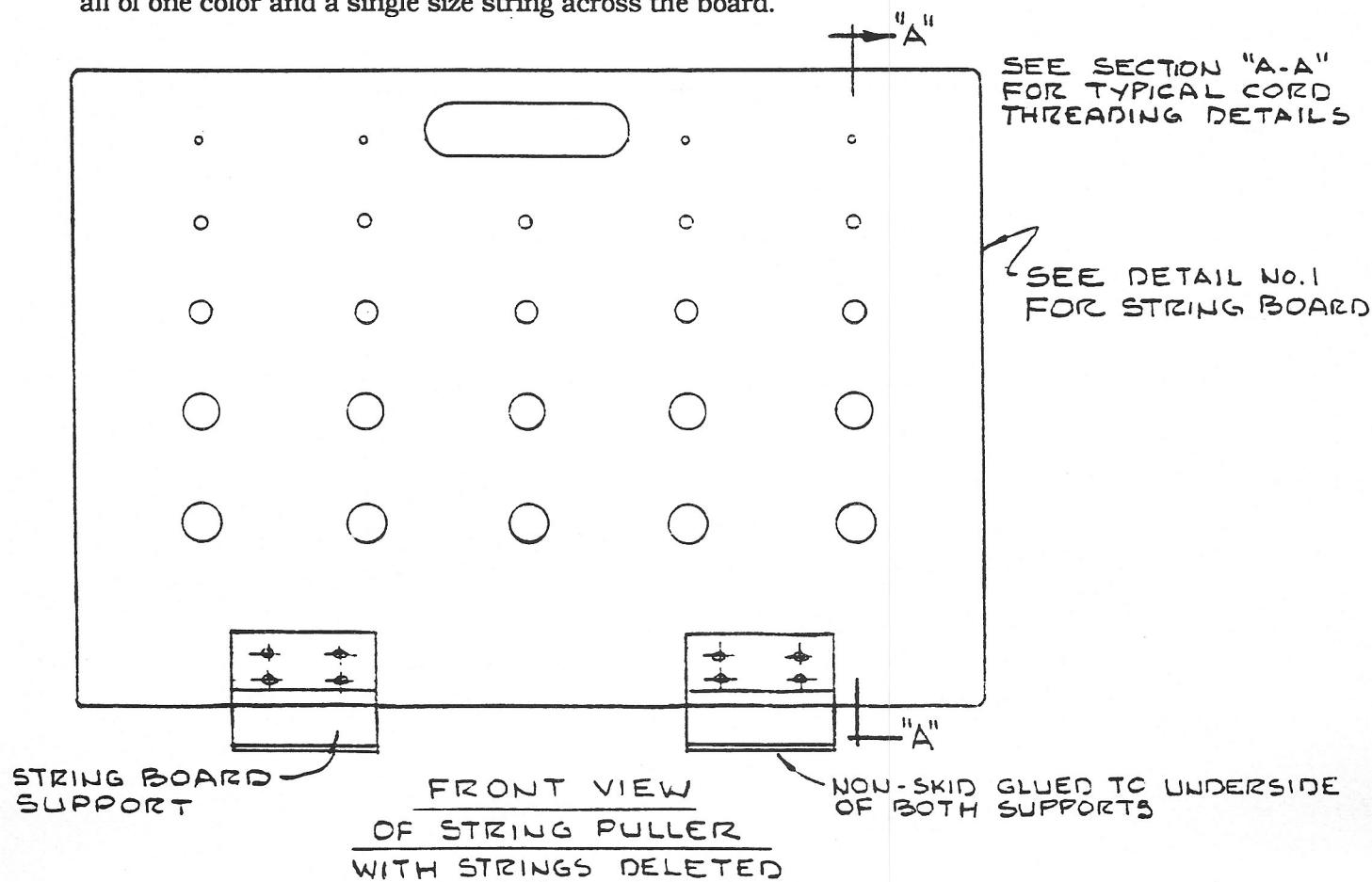


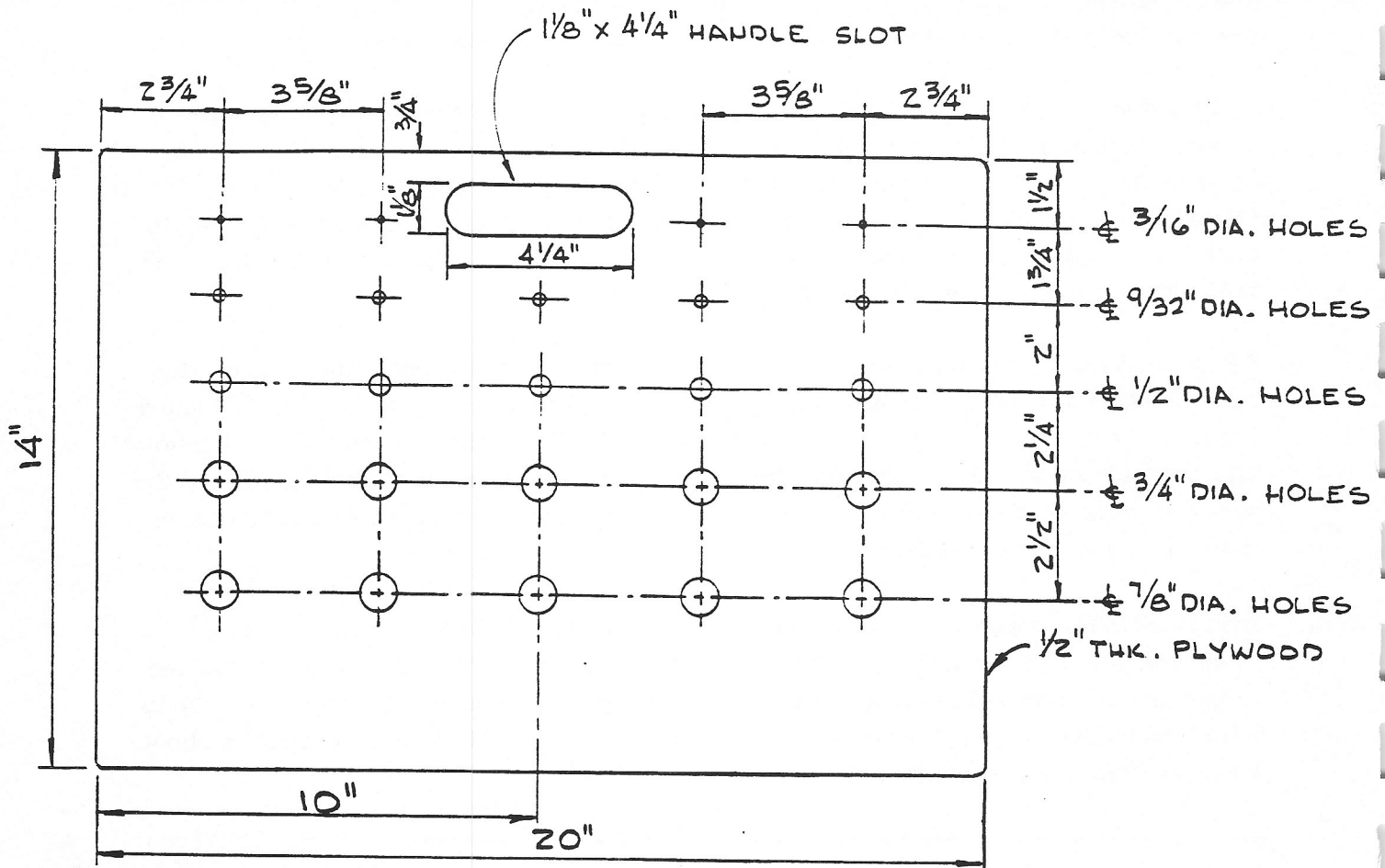
Use the sander or a sanding block to sand the sides and edges of the string board and the support shoes. Sand all edges of the handle slot. Varnish all the flat wood pieces.

Using a marking pen, mark off each 48" length of string into 9 1/2" pieces. Wrap a piece of masking tape around the string at each 9 1/2" mark. Then, using the razor knife, cut the nylon string at the 9 1/2" length. The tape will keep the nylon string from unravelling. Put on the old gloves and hold a taped cut end over a gas flame briefly to melt the fibers a little way back. Withdraw from the gas flame and roll the hot end to assure that the melted fibers will weld together as they cool. Remove the masking tape.

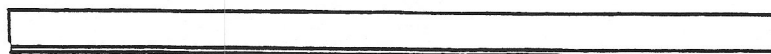
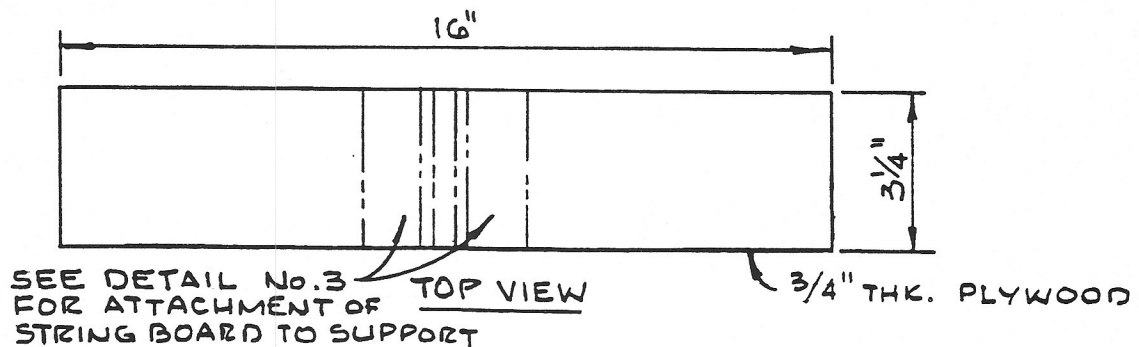
Detail No. 3 shows how to make the 16 braces that will hold the support shoes to the string board. Start each brace piece with four pieces of birch plywood 1 1/2" x 3 1/4" x 3/8" glued together. Then make a 45° saw cut as shown and drill 1/8" diameter holes and countersink to take the four screws. Glue and screw the braces into place to join the support shoes and the string board as shown in several drawings. Using contact cement, put non-skid material on the bottom and trim the edges.

Drill holes in the wooden balls as described on the Section A-A drawing. Dip one end of a welded section of string in Elmer's Carpenter's Glue and force it into the hole of a ball of the proper size and color. Slip the string through the proper size hole in the string board, dip the other end in glue and slip the end into the corresponding ball. The result will be lines of balls all of one color and a single size string across the board.





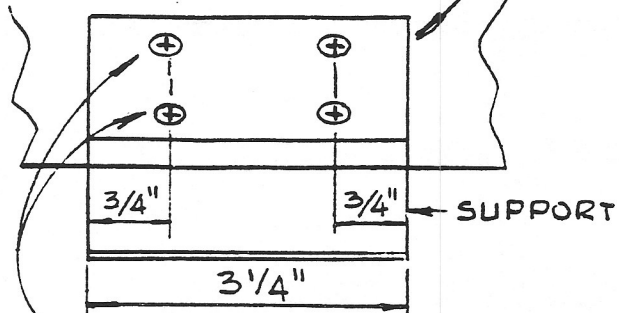
DETAIL NO.1 - STRING BOARD



SIDE VIEW

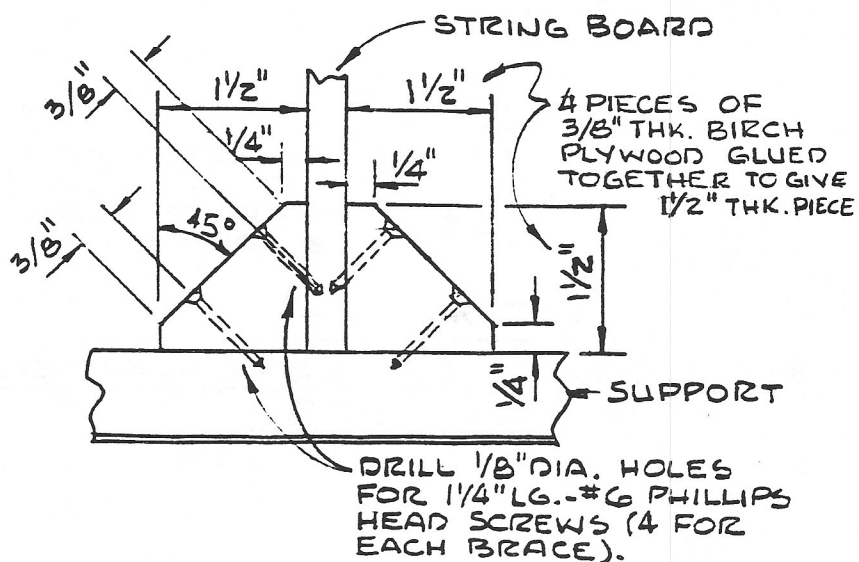
DETAIL NO.2 - SUPPORT  
(2 REQ'D)

WOOD BRACE FOR STRING BOARD (DIMENSIONS SHOWN ON SIDE VIEW) - 4 REQ'D.



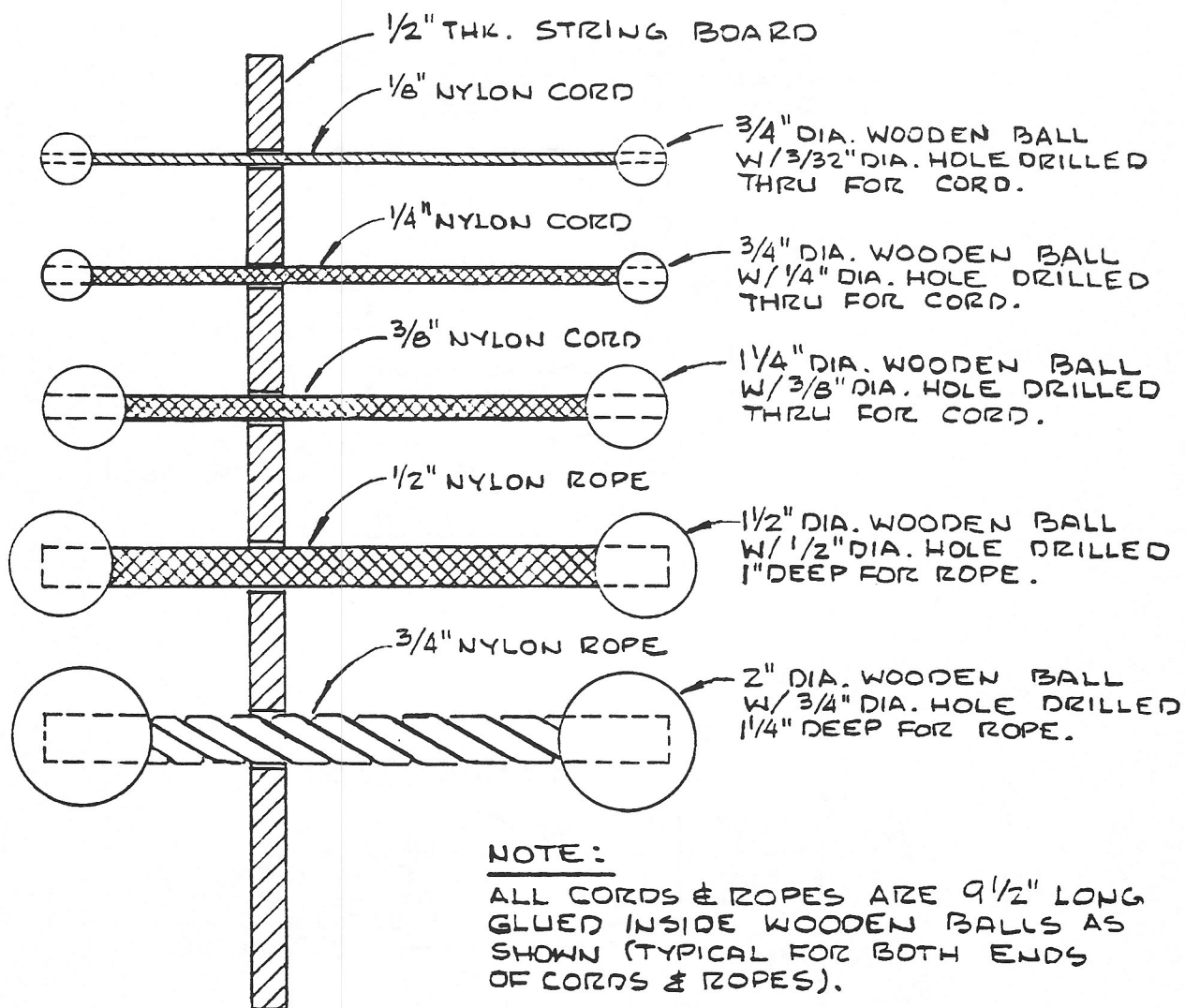
LOCATION OF PHILLIPS HEAD SCREWS (TYP) ALSO SEE SIDEVIEW

FRONT VIEW



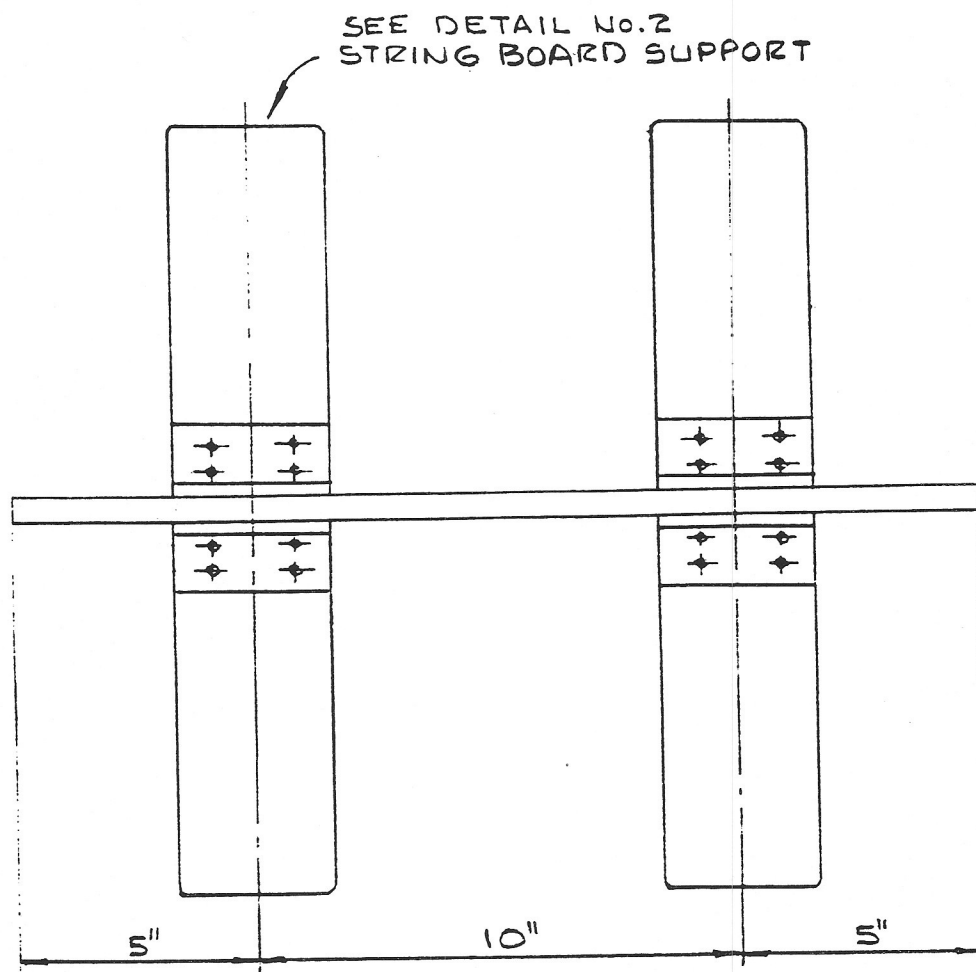
SIDE VIEW

DETAIL No.3 - STRING BOARD TO SUPPORT  
ATTACHMENT WITH WOOD BRACES



### SECTION "A-A"

DETAIL SHOWING CORD & ROPE INSERTION  
IN STRING BOARD



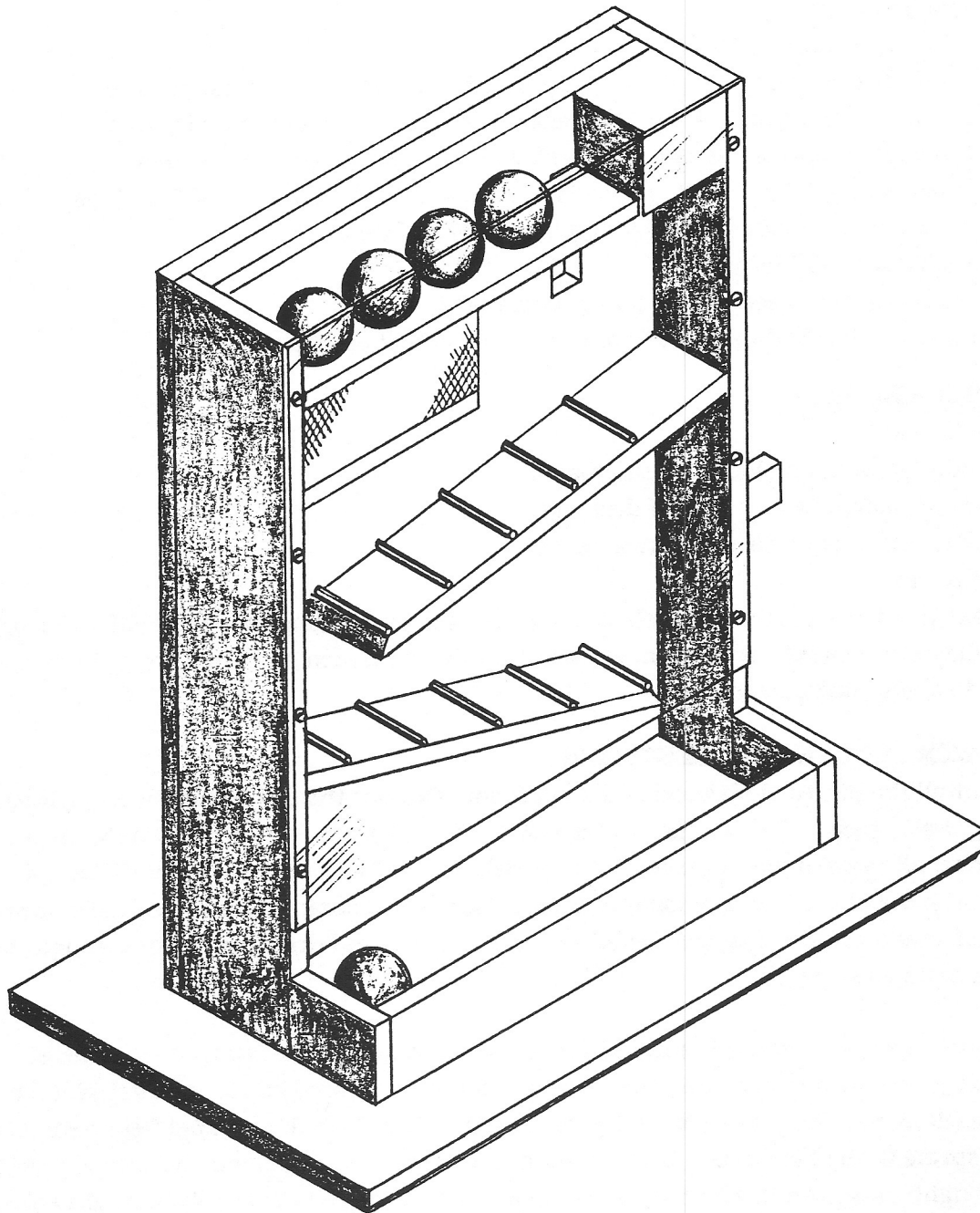
TOP VIEW  
OF STRING PULLER  
WITH STRINGS DELETED





The name of this toy stems from the sound the balls make as they roll down the ramps. Although this toy can be used for a number of cognitive, motor, visual and social purposes such as counting, color identification, reaching, tracking and turn-taking, it has one feature which is extremely helpful. Placing the toy directly in front of the child blocks other potential visual distractions in the room. To allow for ease in tracking the ball's movement down the ramp, the color of the inside housing and the color of the balls should be contrasting.

The Clackin' Balls toy takes a while to build but the construction is not difficult if you follow the steps. None of the materials are difficult to find.



**MATERIALS NEEDED**

- Almost without exception, the wooden pieces are cut from 3/8" thick birch plywood. A piece 18" x 36" should be large enough to make all the individual pieces.
- One piece of high density foam padding 4" x 1 3/8" x 1 1/2" obtainable from an upholstery shop or fabric store
- One piece Lexan, or equal, polycarbonate 11 1/4" x 11 1/4" x 1/8"
- One piece plywood 4" x 1 1/2" to hold foam padding in place
- Eight #4 x 1/2" pan head tapping screws to hold Lexan in place
- Six #6 x 1" flat head Phillips screws to hold back panel in place
- Miscellaneous plates and screws as detailed on drawings for control lever, control rod and moveable ball ledge
- Elmer's Carpenter's Glue
- Enamel for ball ledge, ramps, and associated "interior" area and for outside surfaces
- The #156 spring, which is 7/8" diameter and 3 1/4" long, obtained from the "Select-A-Spring" spring cabinet and display in many large hardware stores
- Five wooden balls 1 1/2" diameter These are #46 balls from Cherry Tree Toys, Inc. (See Some Sources of Specialty Items at bottom of Table of Contents.)
- Non-skid material for bottom
- Contact cement to secure the non-skid material
- Ten pieces of 1/8" dowel 1 1/2" long and sanded flat on one side.

**TOOLS NEEDED**

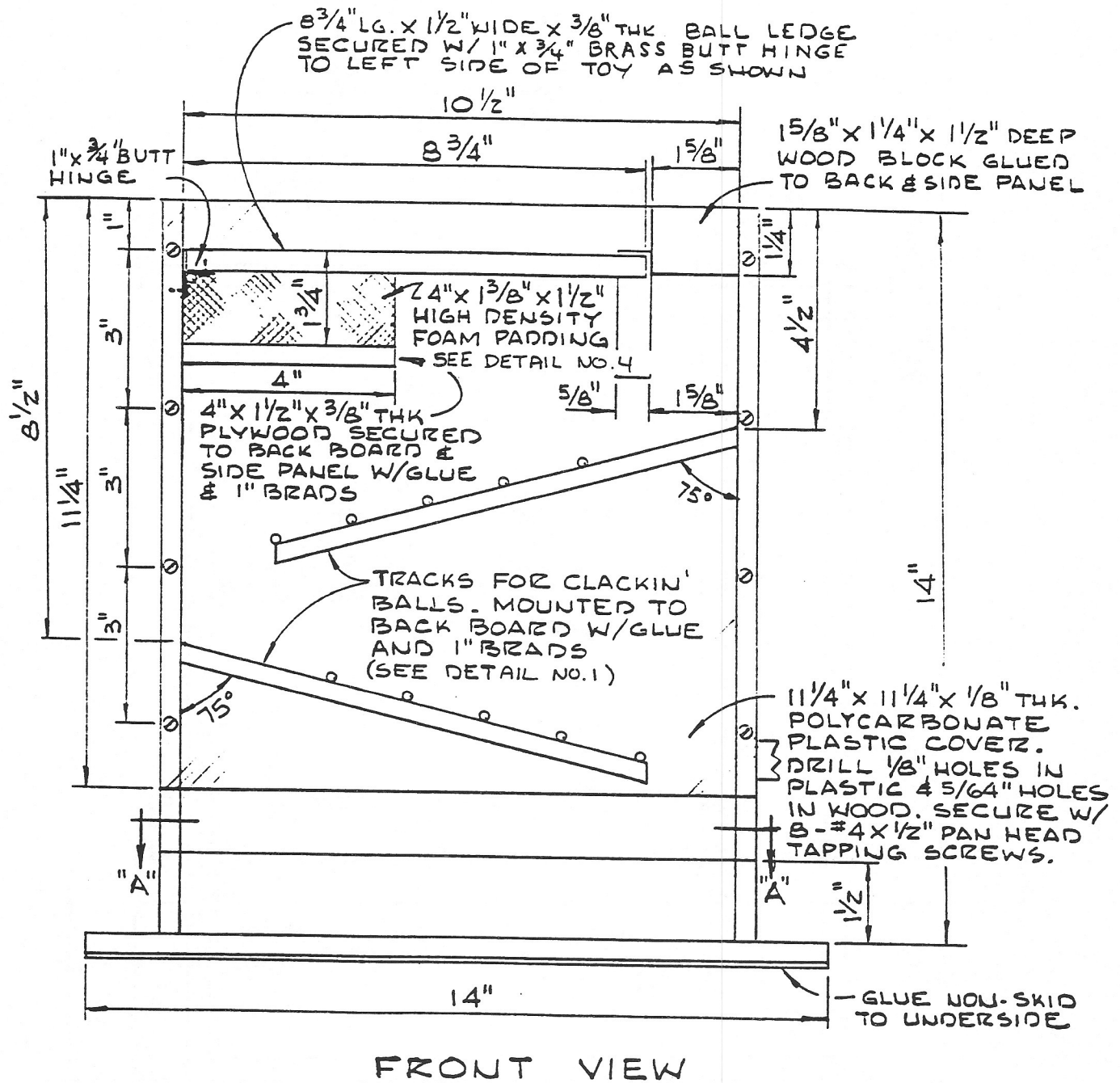
- Table saw
- Sander or sanding block and sandpaper
- Hand or power drill and set of drill bits
- Ruler, pencil, screwdrivers, brushes, etc.
- Saber saw
- Make a cutter to cut a 7/8" hole in the piece of foam padding by cutting off a 2" length of 7/8" diameter outside dimension, electrical conduit and then sharpen it by holding it at a 45° angle to a spinning emery wheel.

**CONSTRUCTION SUGGESTIONS**

Cut out all the pieces of plywood and sand them. Cut out the slot in the inner back panel and the right side piece. Cut out the 3/8" x 1/2" x 10 7/8" piece. (See Right Side View of Toy.) Assemble all wooden pieces, except back panel, using 1" #17 brads and glue. Place 4" x 1 3/8" x 1 1/2" piece of high density foam padding on a piece of scrap wood. Place the sharpened piece of conduit in position (see Detail No. 4), compress and drive the cutter through the foam with a hammer blow.

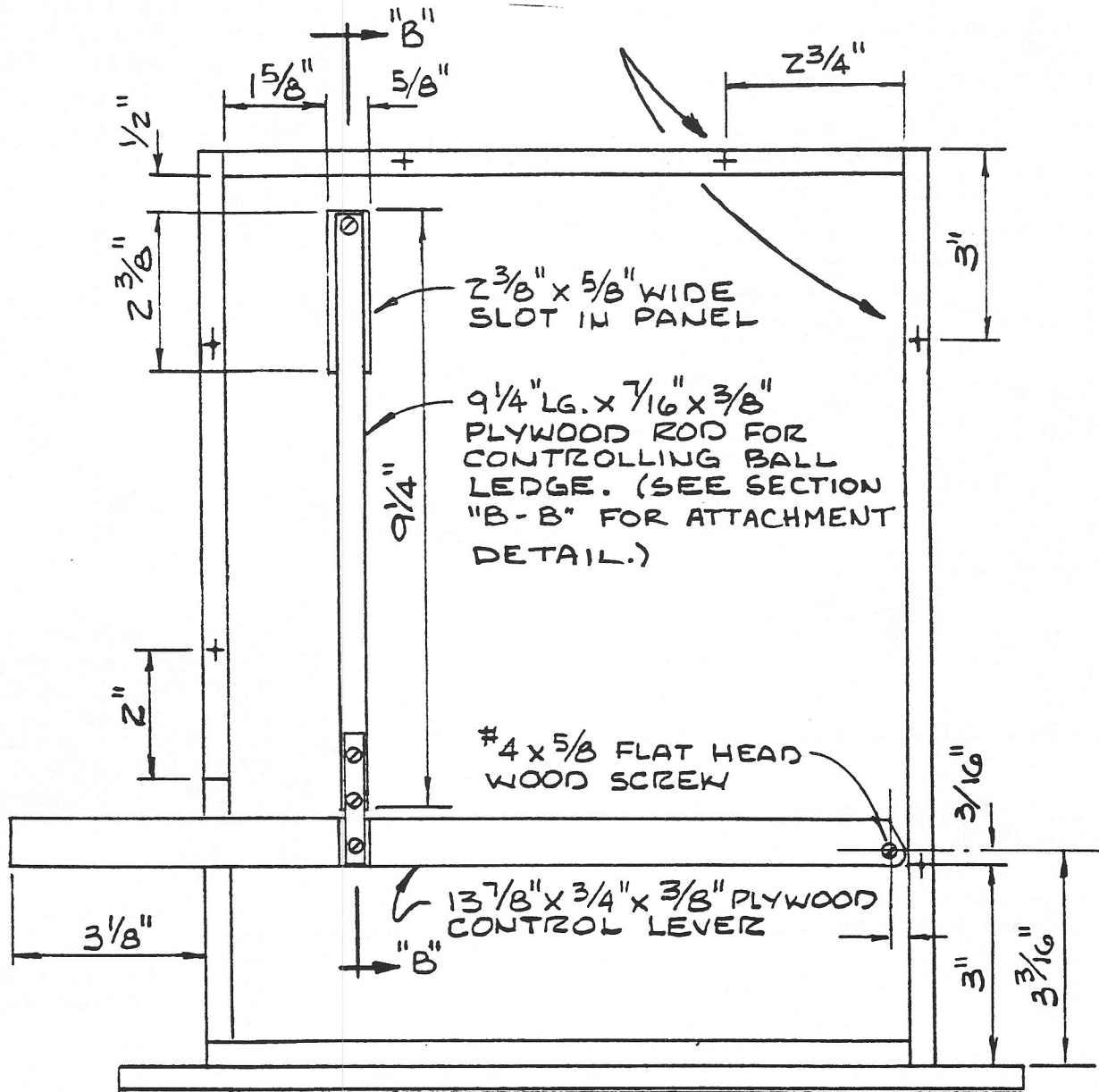
Measure, mark and mount the tracks for the balls. Attach the hinge to the ball ledge and that assembly as shown in the Front View. Attach the rear plywood rod to the control lever, mount onto back panel. Fasten the ball ledge as shown in Rear View With Panel Removed. Place the #156 spring in the hole in the foam padding, compress the spring and slip it into place (spring to the right) as shown in Front View. Use colored balls or paint the balls in bright colors. Put the five wooden balls on the ball ledge and test the control lever release. Adjust as needed.

Remove the foam padding. Place masking tape as required and spray the inside area. When dry, reverse the masking tape and spray or brush the outside. Cut the clear Lexan, or other polycarbonate. Drill holes in it and in the front of the side pieces as shown in the Front View. Fasten the plastic cover with eight #4 x 1/2" tapping screws. Fasten the non-skid material to the bottom using contact cement, two coats to each surface.



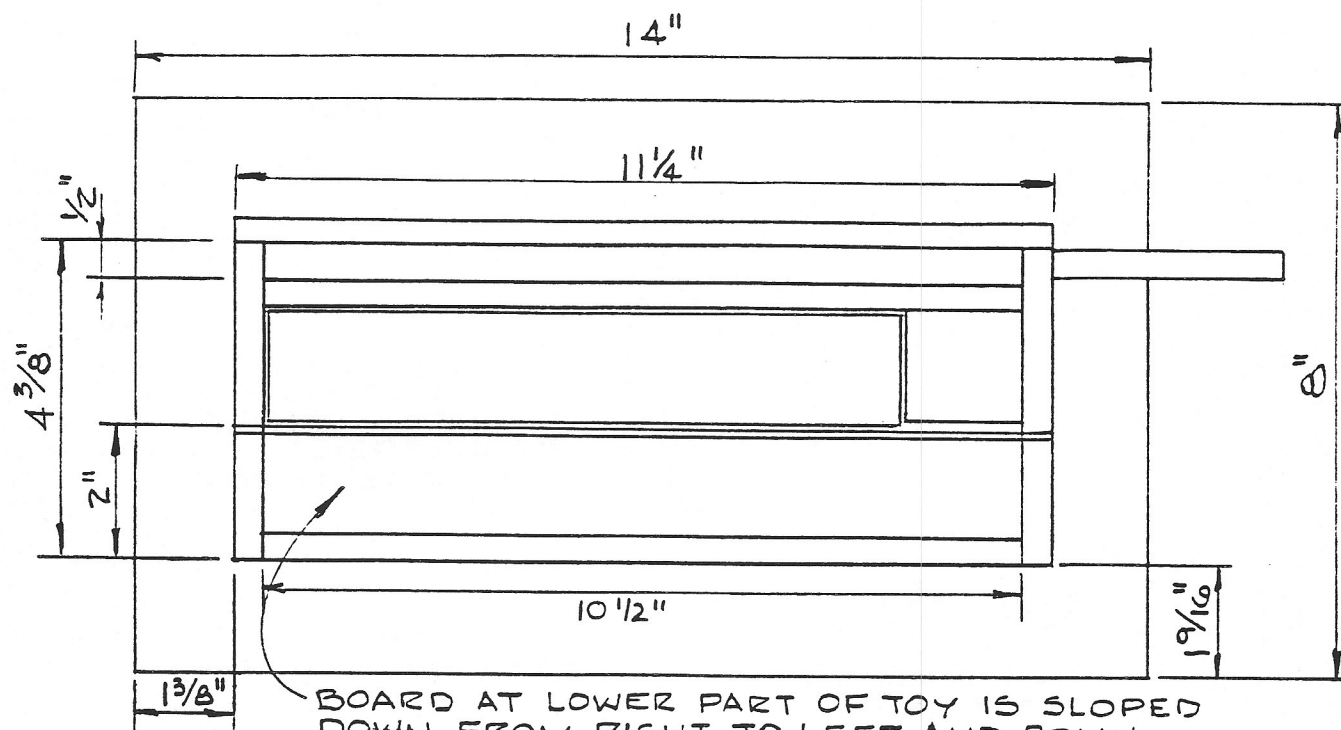
NOTE: Dimensions shown are based on plywood being 3/8" thick. Actual thickness of plywood may differ slightly. Unless specified otherwise, material is 3/8" plywood secured together with glue.

SECURE REAR PANEL  
WITH 6 - 1"X#6 FLAT  
HEAD PHILLIPS SCREWS  
DRILL  $9/64$ " HOLES IN  
REAR PANEL AND  
COUNTERSINK FOR  
SCREW HEADS.  
DRILL  $3/32$ " HOLES  
IN ASSEMBLED BOX  
IN APPROX. LOCATIONS  
AS SHOWN



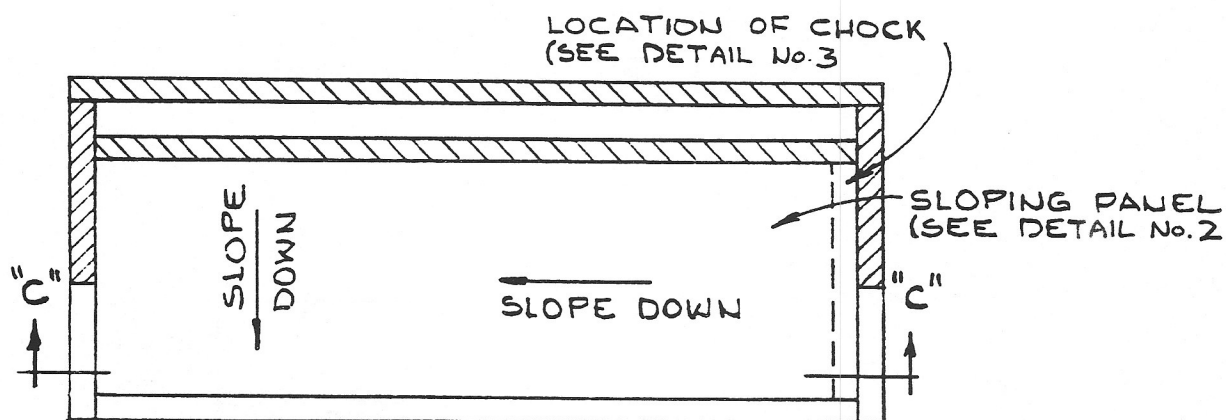
REAR VIEW  
WITH REAR PANEL REMOVED





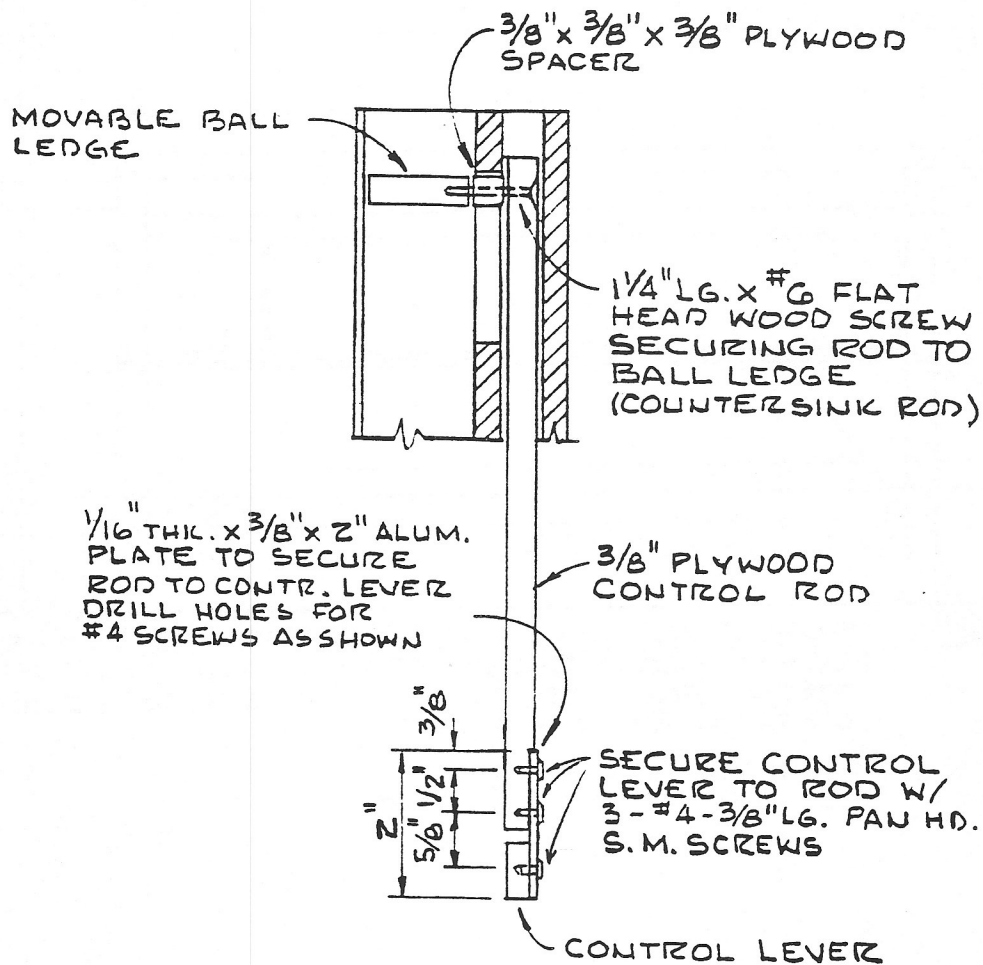
BOARD AT LOWER PART OF TOY IS SLOPED DOWN FROM RIGHT TO LEFT AND DOWN FROM BACK TO FRONT. (SEE CONSTRUCTION DETAIL BELOW).

TOP VIEW

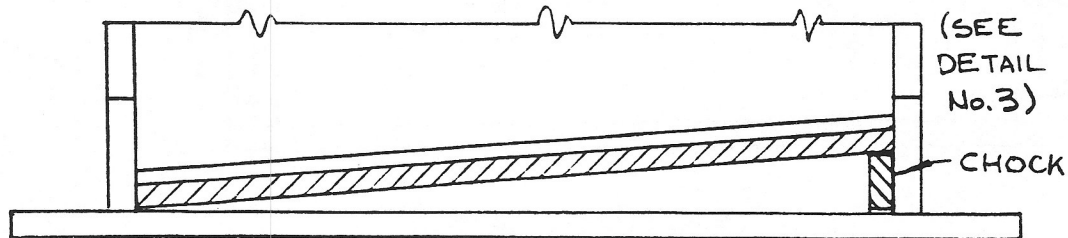


SECTION "A-A"

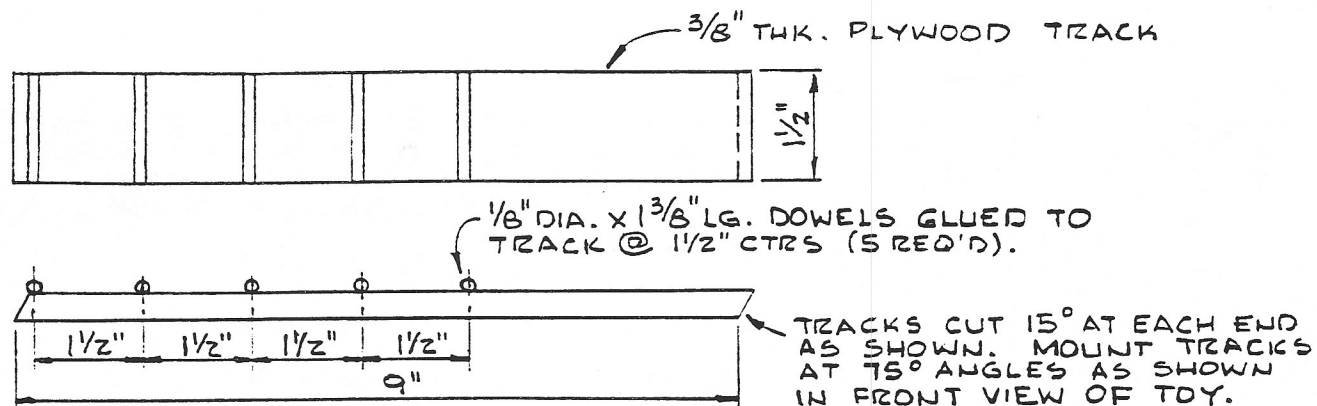
LOWER PART OF TOY - SHOWING SLOPING



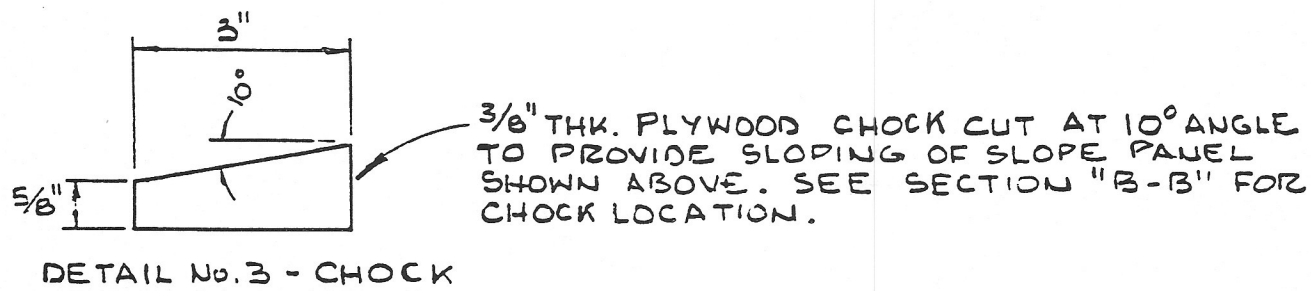
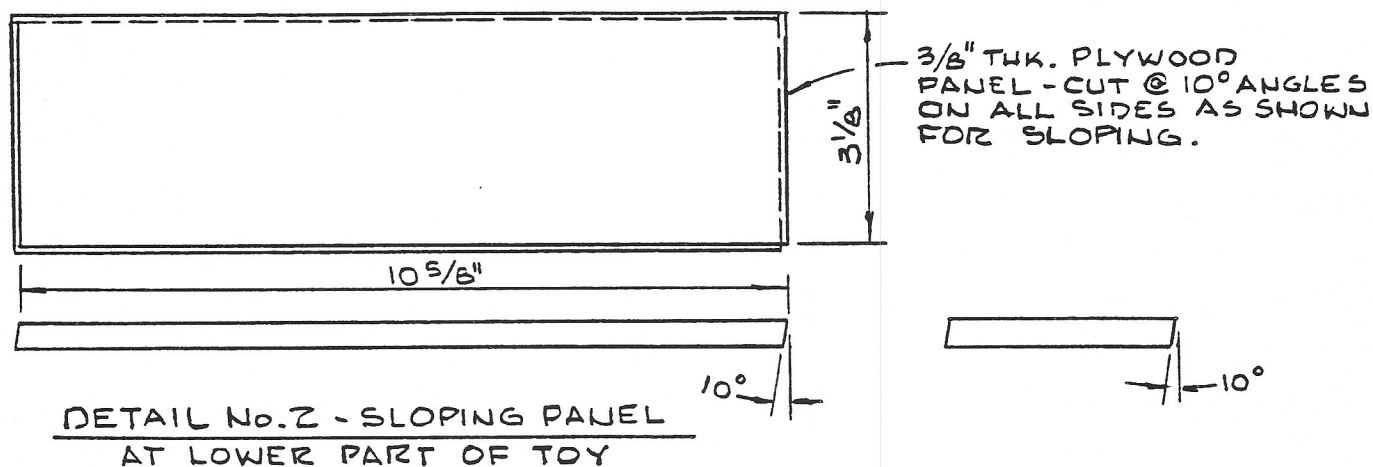
SECTION "B-B"  
DETAIL SHOWING CONTROL MECHANISM

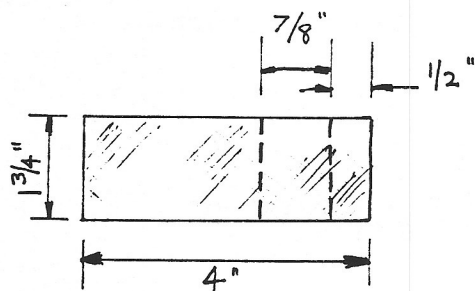


SECTION "C-C"



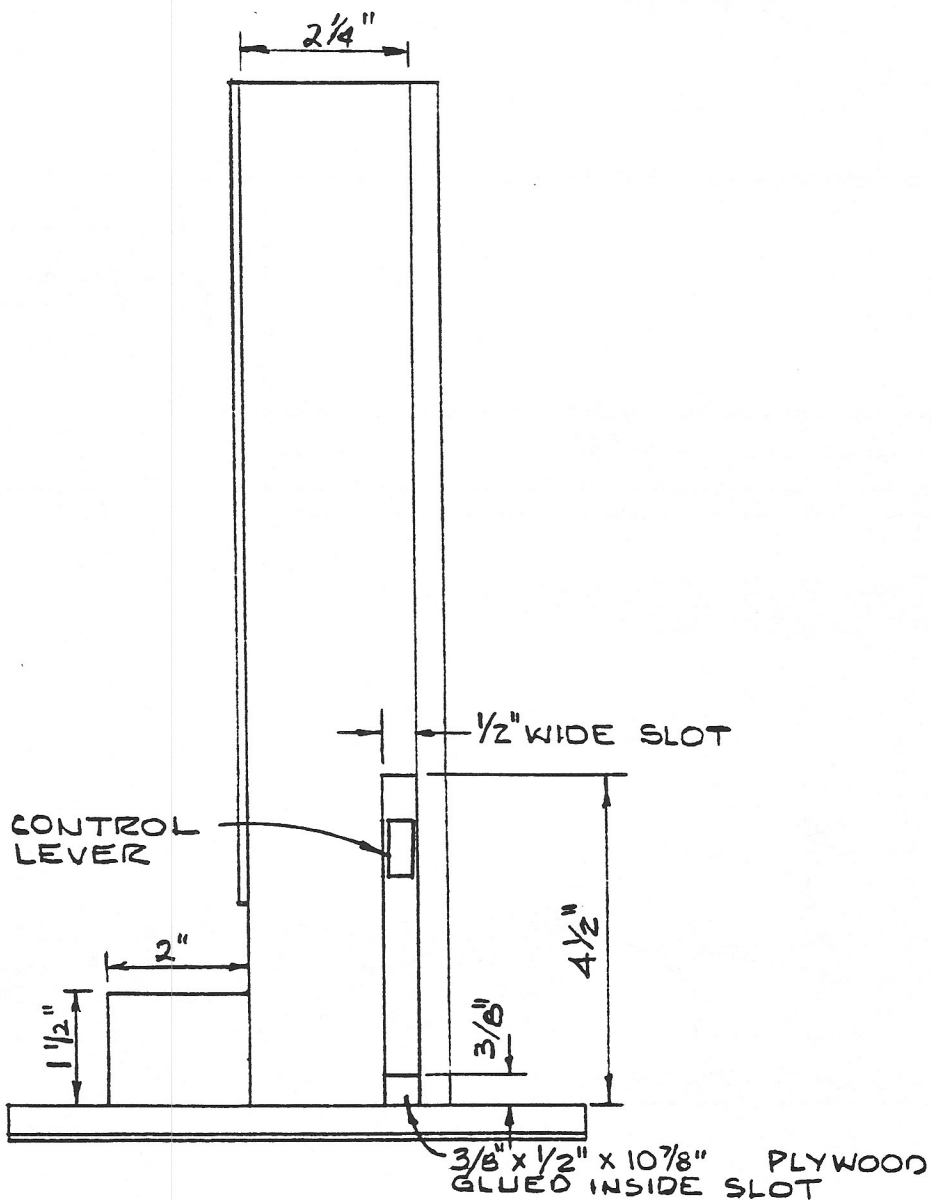
DETAIL No. 1 - TRACK  
(2 REQ'D)





HOLE CUT WITH SHARPENED 2" SCRAP  
PIECE OF 7/8" O.D. CONDUIT. PLACE  
SPRING No. 156 IN HOLE, COMPRESS  
AND PLACE ASSEMBLY AS SHOWN ON  
FRONT VIEW.

DETAIL No. 4 - FOAM PAD WITH SPRING

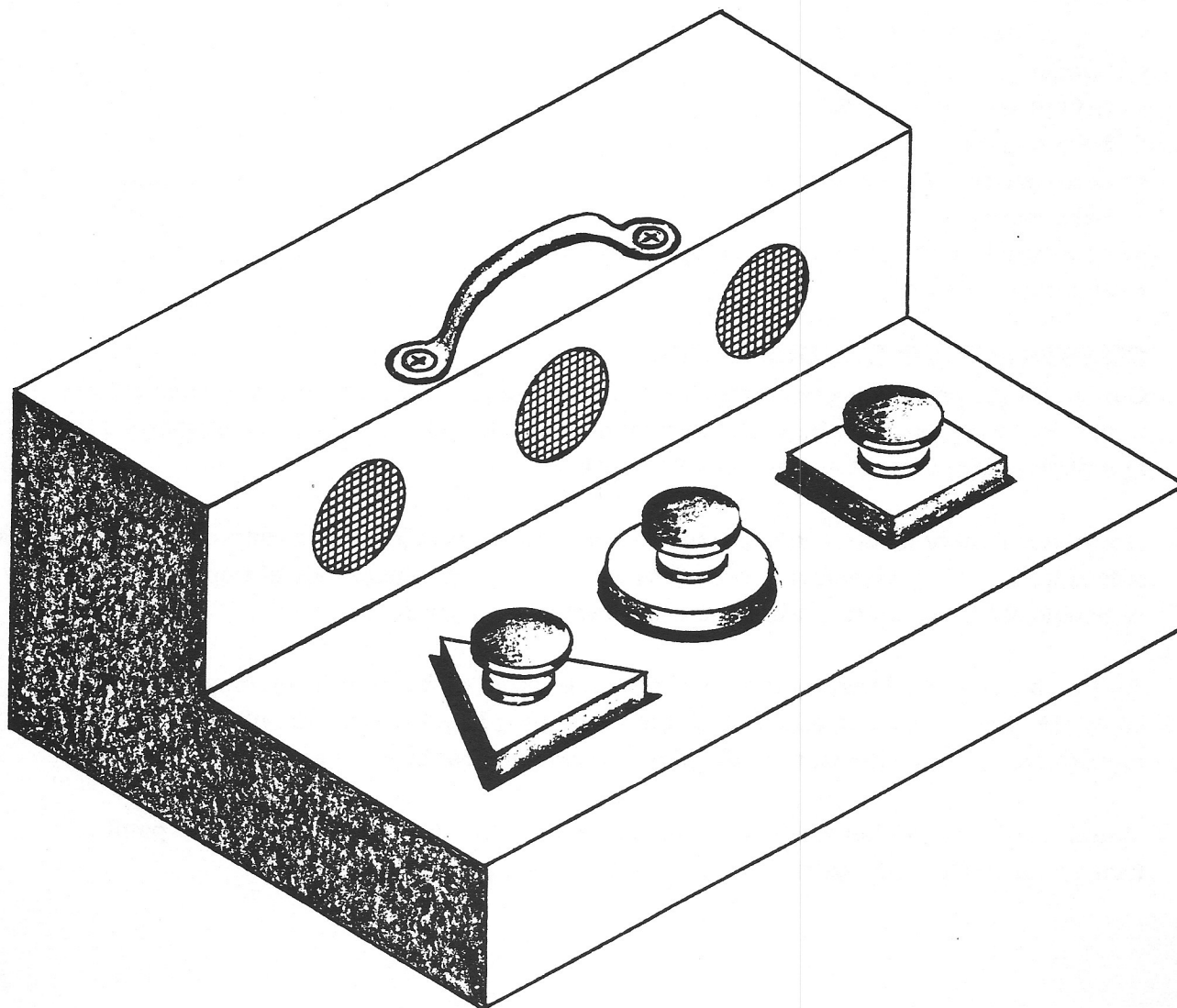


RIGHT SIDE VIEW OF TOY

Making this toy requires quite a lot of patience, knowledge about soldering wires, and the ability to follow detailed drawings. But, in all, it is not a difficult toy to make.

**MATERIALS NEEDED**

- One piece of 5/8" birch plywood 12" x 5" for top panel
- One piece of 3/8" birch plywood 12" x 24" for remaining parts
- One Stanley #CD-479 door pull (handle)
- Three 1 1/4" diameter wood knobs
- One piece 3/4" plywood 3" x 10" for plugs
- Twelve 1" x #4 Phillips head wood screws
- Thirteen 1" x #17 brads
- Sixteen 1/4" carpet tacks
- Four rubber bumpers (feet)
- One 1 1/2" x 7/8" butt hinge
- One piece 1" x 3/4" x 1/32" approx. sheet metal for door plate





- Nine 3/8" x #4 sheet metal screws for door plate, hinge and switch
- One "on-off" switch, Radio Shack #275-401
- Two "C" size battery holders, Radio Shack #270-402
- Two "C" size batteries
- Three Sankyo Electronic Music Movements, #30063, #30064 and #30078 from Klockit (See Some Sources of Specialty Items at bottom of Table of Contents.)
- 22 gauge wire
- 2 1/2" x 9" piece of #16 wire screen (as on house windows)
- Acid-core solder
- Four colors of Varathane, or equal, enamel
- Elmer's Carpenter's Glue
- Piece of thin cloth used behind the #16 screen on the front panel. Cloth is also used on switch plate mounting board and should be painted to correspond with the colors of the round, square, and triangular plugs

### TOOLS NEEDED

- Table saw
- Adjustable circle cutter
- Sander or sanding block with sandpaper
- Drill press and set of drills
- Soldering iron
- Screwdrivers: Phillips and straight
- Saber saw
- Paintbrushes and three colors of Varathane enamel
- Hammer, ruler, etc.

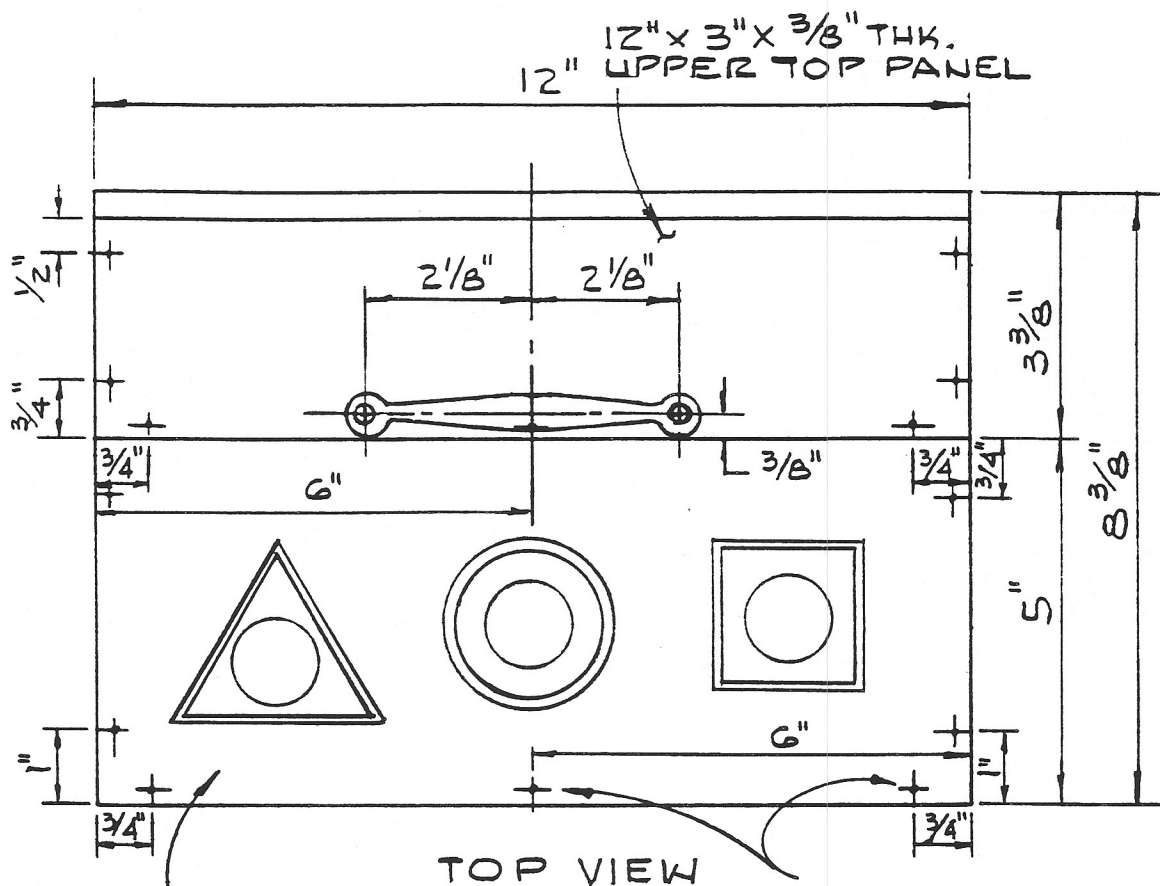
### CONSTRUCTION SUGGESTIONS

Cut out all the plywood pieces according to the drawings. Make cut-outs for plugs on top panel. Make cut-outs on the back panel for door. Make door to fit door opening and fit hinges and plate. Make cut-out on back panel for switch.

Mount two battery holders on back side of door. Secure screening and cloth over holes on back side of front panel. Assemble music movement and wiring to back side of front panel. Assemble all sides, top and bottom and sand smooth on sander.

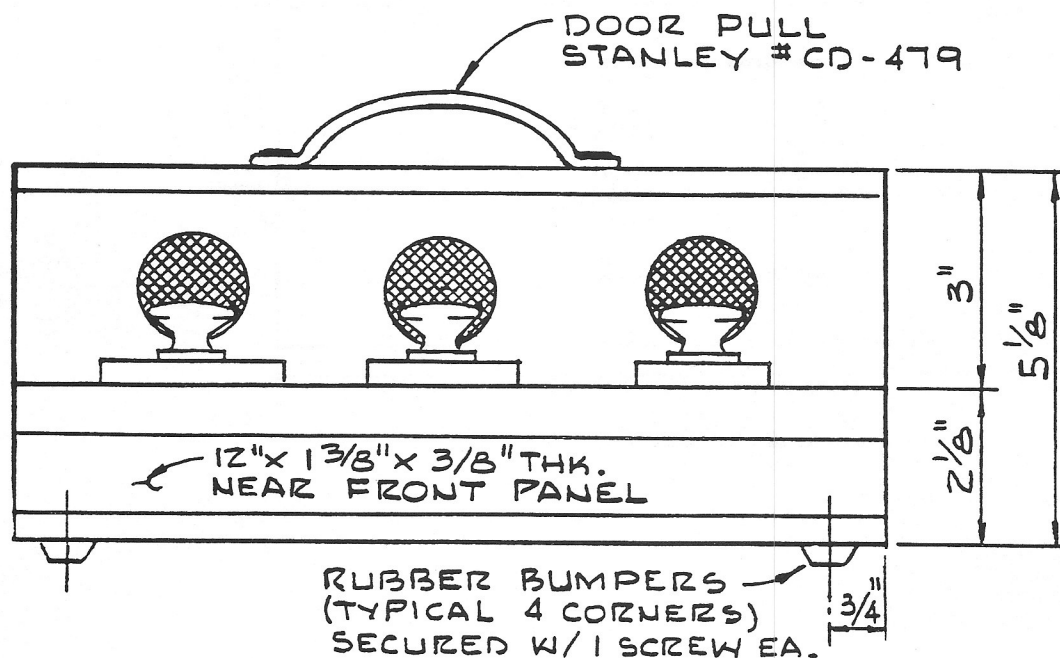
Remove bottom panel and complete wiring. Glue wood knobs in place on plugs. Paint completed box. Paint a border 1/4" around each plug hole to match the plug. Continue the painted border down the sides of the plug hole and across the cloth bottom.


Mount the handle on top as shown in the drawing. Glue colored sheet plastic or paint a triangle above the rear switch as shown in the drawing.



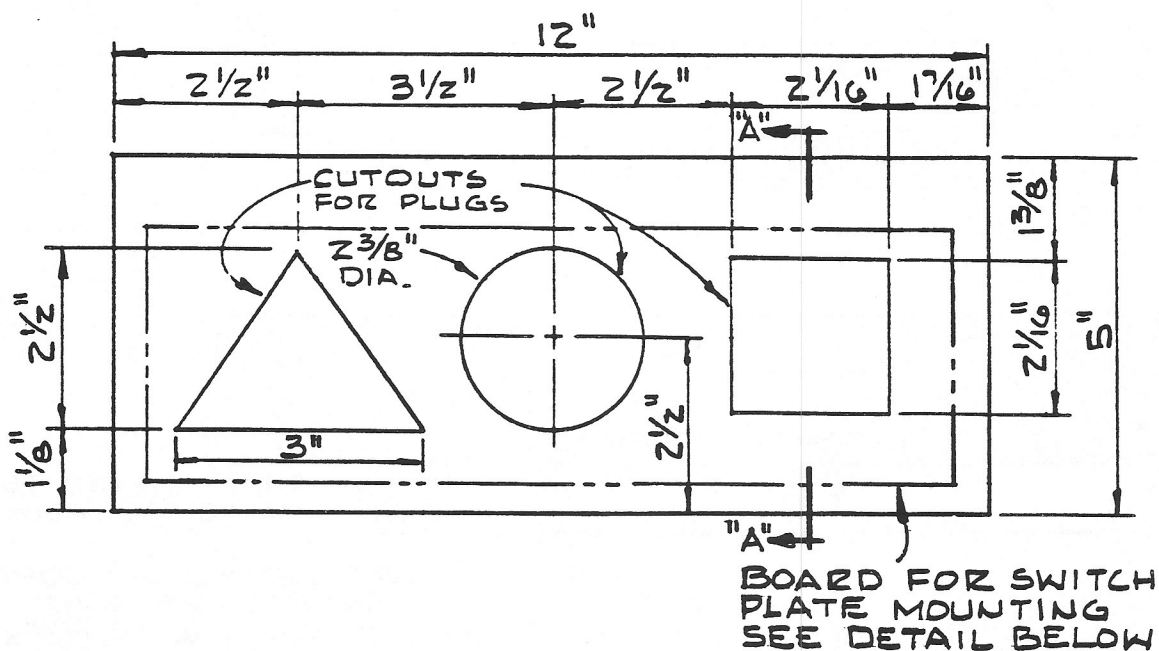
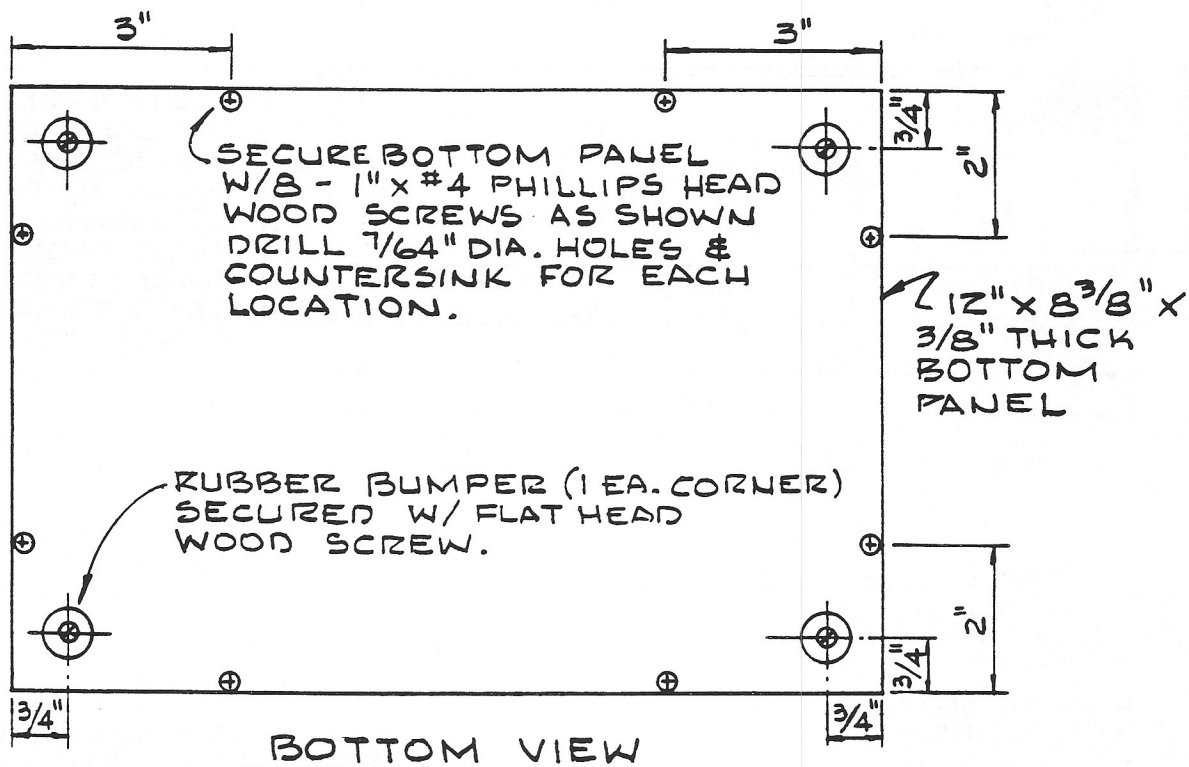
12"  $\times$  5"  $\times$   $\frac{3}{4}$ " THK.  
TOP PANEL  
SEE DETAIL NO. 1  
FOR CUTOUTS

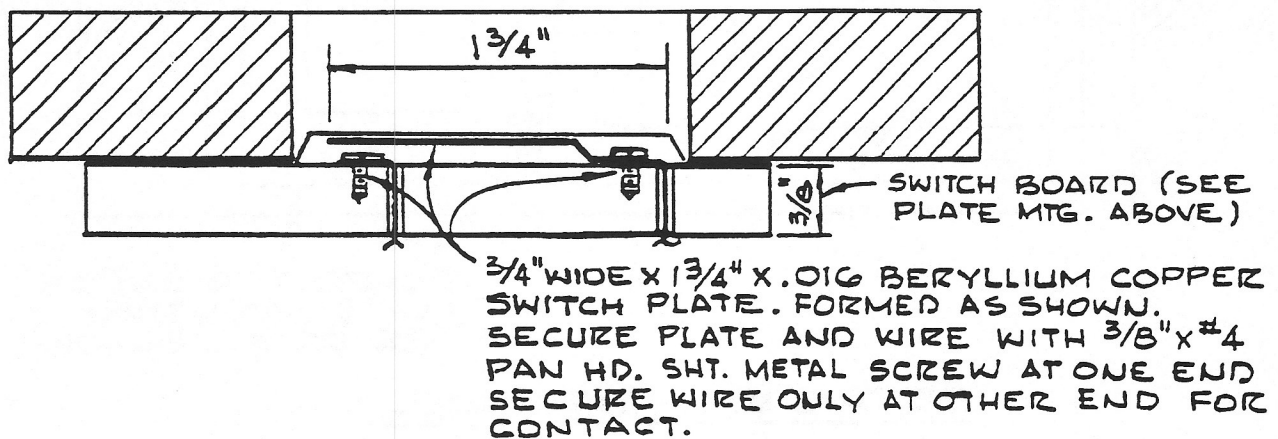
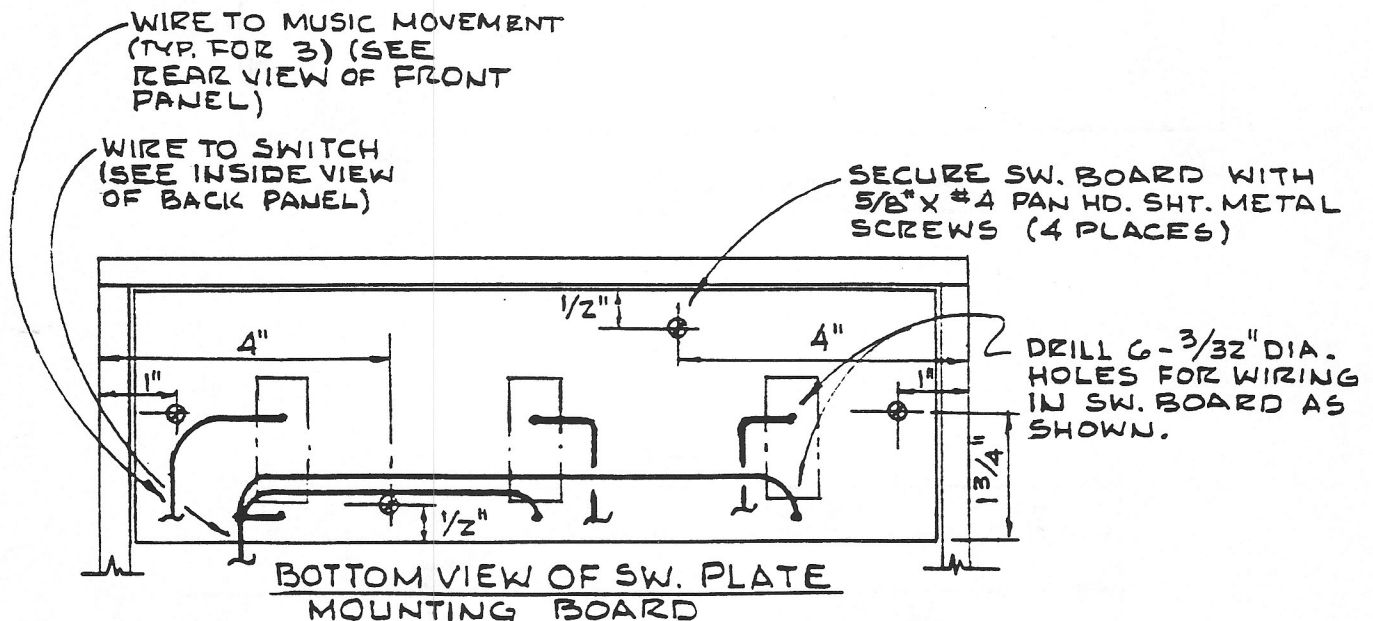
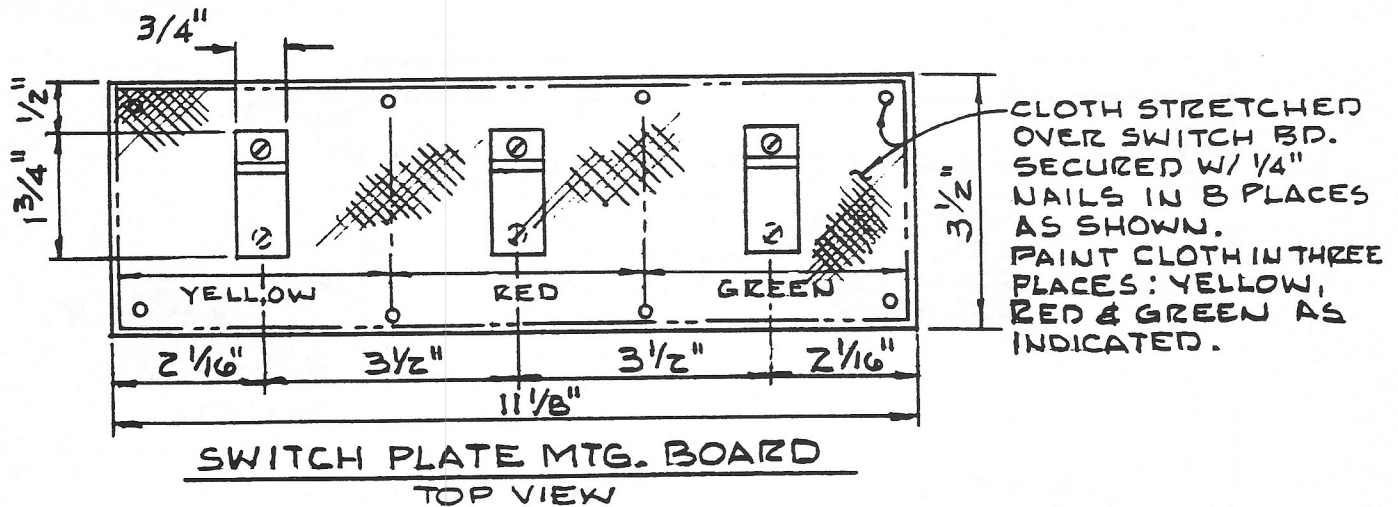
MUSIC BOX ASSEMBLED W/GLUE  
AND 1"-#17 BRADS AS SHOWN  
(14 BRADS SHOWN - THIS VIEW)



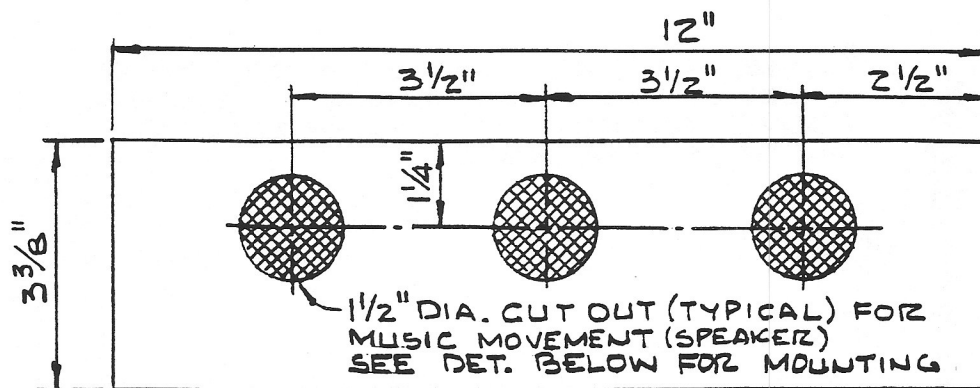


REAR VIEW

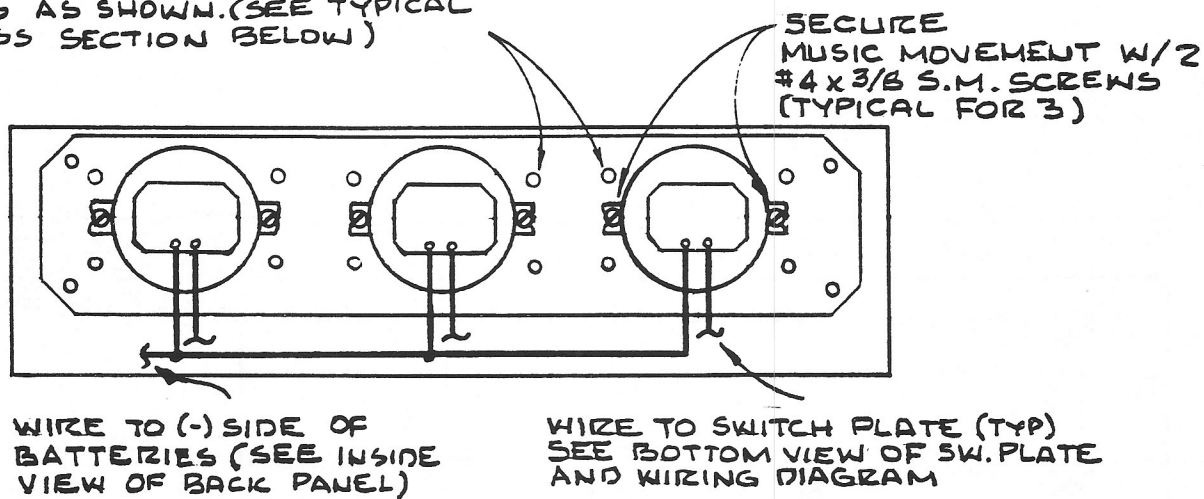


**SECTION "A-A"**

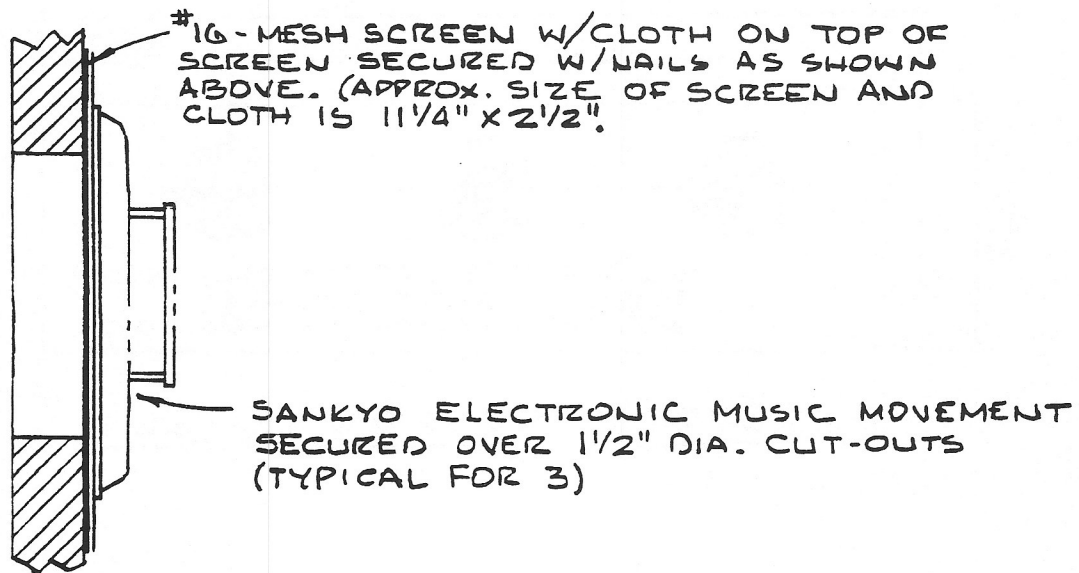


DETAIL NO. 2 - FRONT PANEL

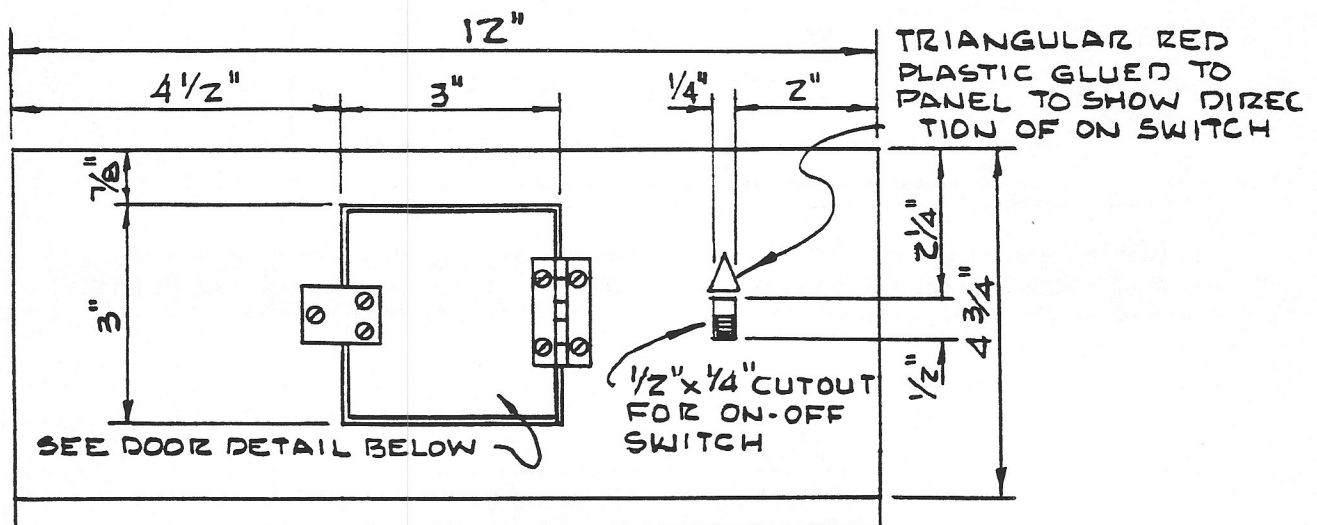
SECURE #16 MESH SCREEN AND CLOTH W/16-1/4" LARGE HD. NAILS AS SHOWN. (SEE TYPICAL CROSS SECTION BELOW)



REAR VIEW OF  
FRONT PANEL



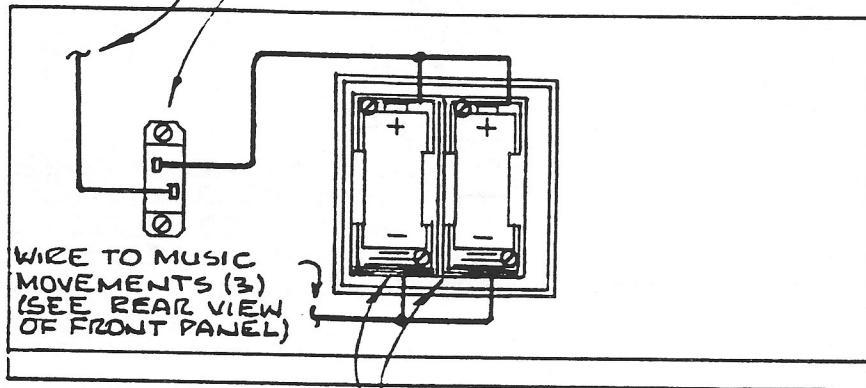
CROSS SECTION OF  
MUSIC MOVEMENT MOUNTING



DETAIL No. 3 - BACK PANEL

WIRE TO MUSIC  
SWITCHES (SEE  
BOTTOM VIEW OF  
SW. PLATE)

ON-OFF SWITCH RADIO SHACK #ZTS-401 SECURED  
W/ 2-3/8" SHT. METAL SCREWS TO INSIDE OF BACK  
PANEL OVER CUTOUT

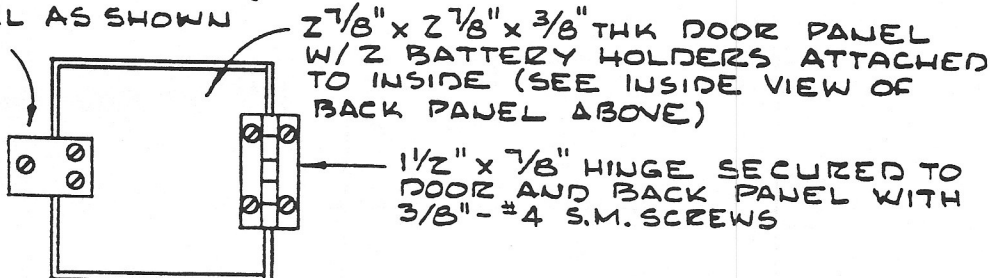


WIRE TO MUSIC  
MOVEMENTS (3)  
(SEE REAR VIEW  
OF FRONT PANEL)

2 BATTERY HOLDERS RADIO SHACK #Z10-40Z  
EACH SECURED WITH 2-3/8" SHEET METAL  
SCREWS TO BACK SIDE OF DOOR

INSIDE VIEW OF BACK PANEL  
SHOWING SWITCH, BATTERIES AND WIRING

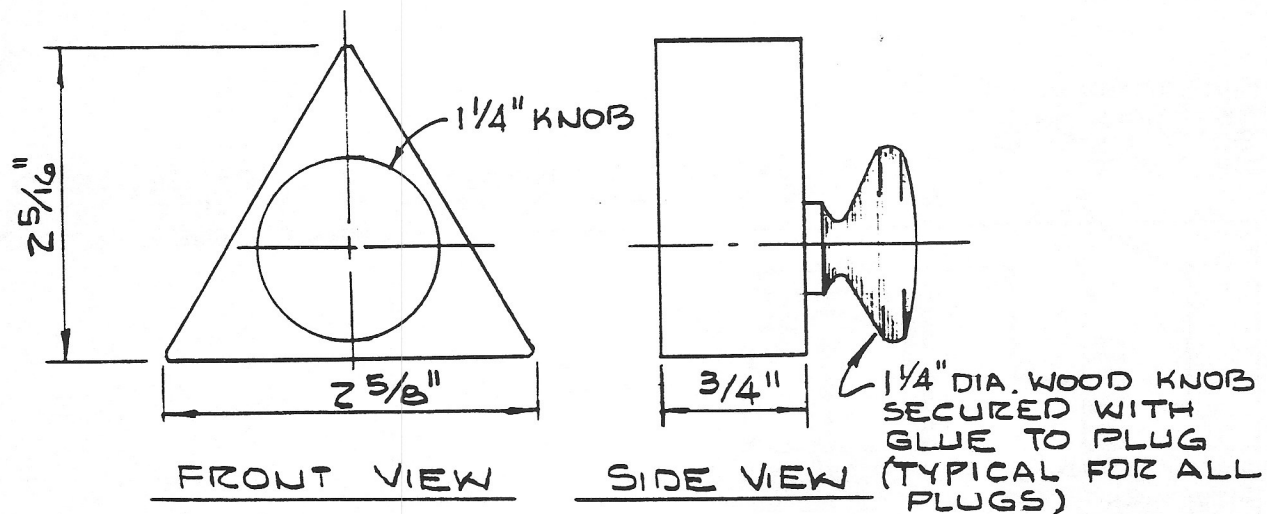
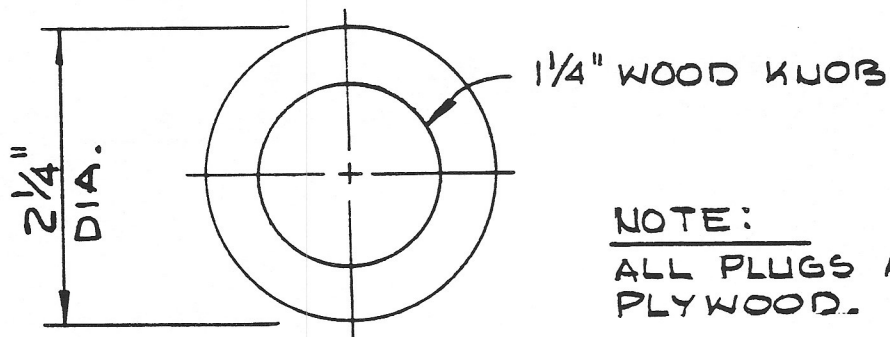
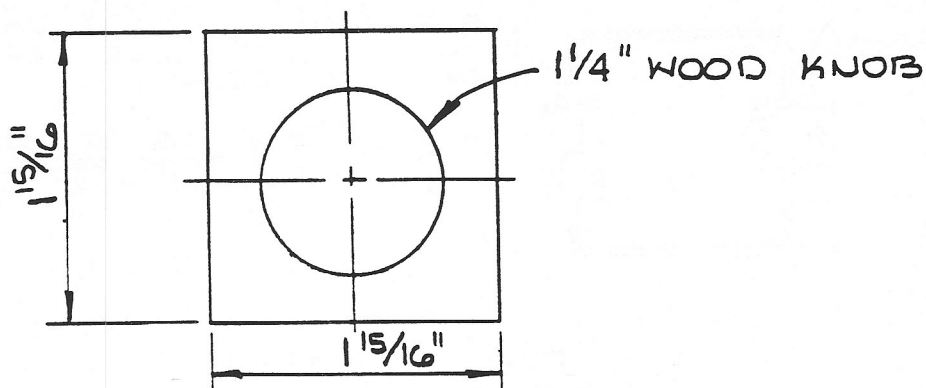
1" x 3/4" METAL PLATE  
SECURED WITH THREE  
3/8"-#4 S.M. SCREWS  
TO DOOR AND BACK  
PANEL AS SHOWN

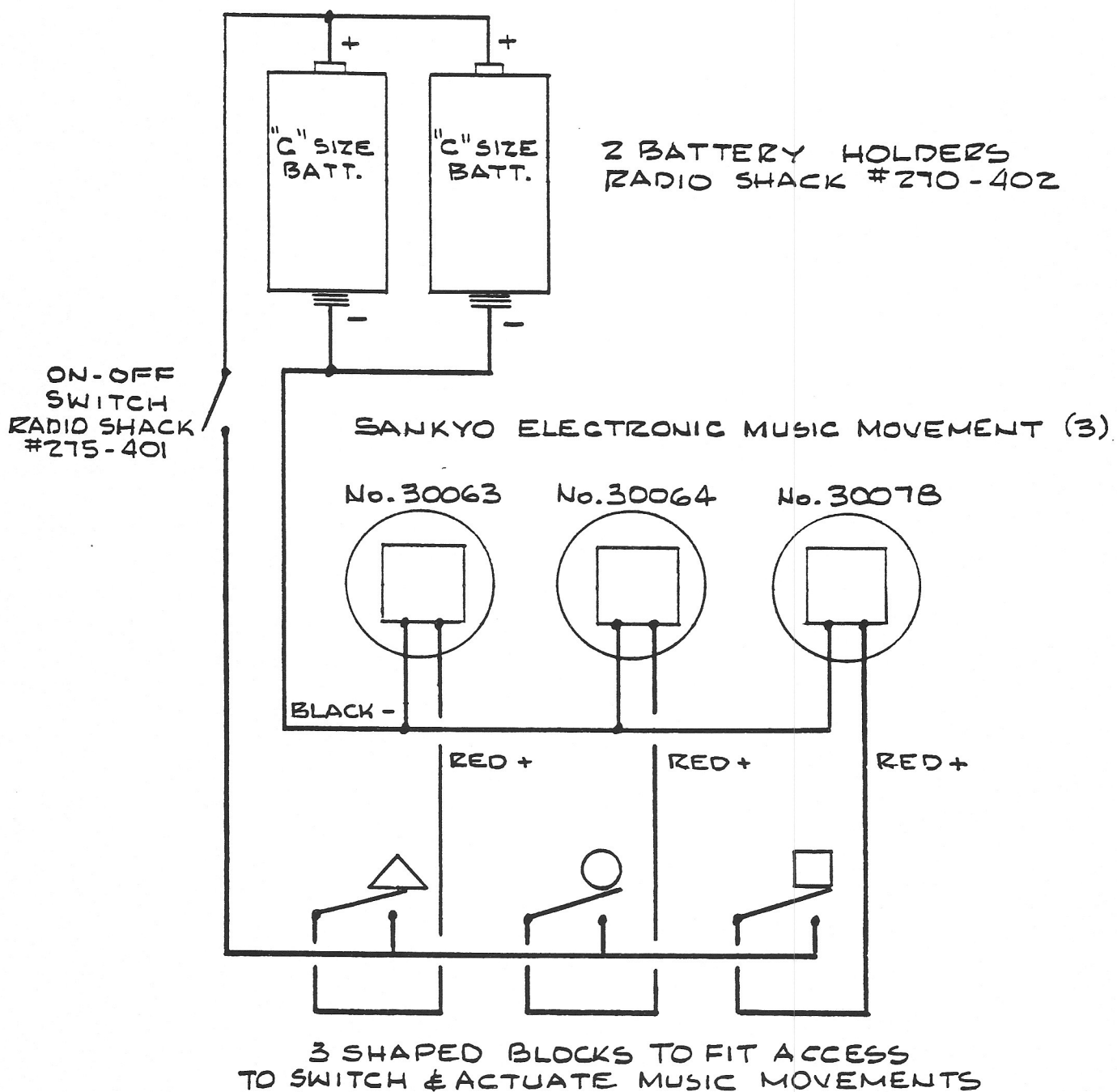


2 7/8" x 2 7/8" x 3/8" THK DOOR PANEL  
W/ 2 BATTERY HOLDERS ATTACHED  
TO INSIDE (SEE INSIDE VIEW OF  
BACK PANEL ABOVE)

1 1/2" x 7/8" HINGE SECURED TO  
DOOR AND BACK PANEL WITH  
3/8"-#4 S.M. SCREWS

DOOR DETAIL

TRIANGULAR PLUGNOTE:ALL PLUGS ARE  $\frac{3}{4}$ " THK.  
PLYWOOD.ROUND PLUGSQUARE PLUG

WIRING DIAGRAM





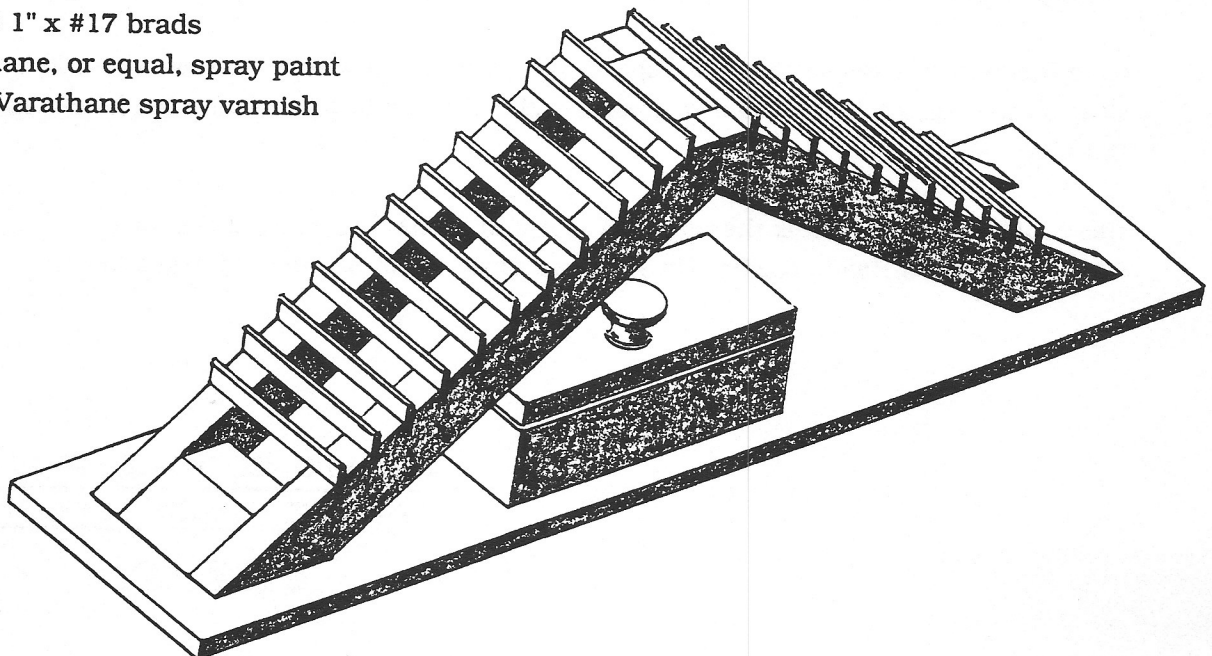
The Ladder Game can be used just as creatively as the imagination will allow. In addition to providing a fine motor activity, cognitive and social concepts can also be stimulated. The players move clothespins up and down the ladder according to the throw of the dice. The clothespins can be painted to resemble people, animals, objects or favorite story characters.

In playing, the characters start at the top or bottom of the ladder and try to be the first to reach the other end. The large dice have a maximum of three dots to allow for a longer game, for easy gripping, and to encourage beginning counting by sight or touch.

While this toy looks somewhat difficult to make, the drawings detailed drawings make each step clear. Patience rather than a high degree of skill is the necessary trait.

### **MATERIALS NEEDED**

- One 22" x 5 1/4" piece of 3/8" birch plywood
- Four pieces of pine lumber with actual dimensions of 13 1/2" x 1 1/2" x 3/4" and cut according to Detail No. 1 - Ladder Side drawing
- Two ladder spacers as shown in Detail No. 2
- One top ladder spacer as shown in Detail No. 3
- Twenty-two ladder strips 3 1/2" x 3/4" of 1/8" thick brightly colored Plexiglas obtained from the Cadillac Plastic and Chemical Co. (See Some Sources of Specialty Items at bottom of Table of Contents.)
- The several pieces of the box, including hinge, knob, and Velcro as detailed in Details of Box
- A 1 1/8" square piece of solid birch, or similar for dice
- A pair of old-fashioned "two legged" wooden clothespins
- A pair of 1" x 3/4" brass butt hinges
- A 1 1/4" diameter knob
- Two small strips of Velcro, hook and loop
- Elmer's Carpenter's Glue
- Twelve 1" x #17 brads
- Varathane, or equal, spray paint
- Gloss Varathane spray varnish



- Bright colors of paint for dice and clothespins
- Non-skid material for the bottom
- Contact cement

### TOOLS NEEDED

- Table saw
- Drill press and a 1/4" brad point drill
- Sander or sanding block and sandpaper
- Brushes, square, ruler, screwdriver, etc.

### CONSTRUCTION SUGGESTIONS

Cut out the base according to Detail No. 5. Cut out the four ladder sides according to Detail No. 1. Note that the slots should permit a snug fit with the Plexiglas strips.

Cut out the top and bottom ladder spacers according to Detail No. 3. Cut out all 22 ladder strips from 1/8" thick Plexiglas. Sand off the sharp corners of the ladder strips that will be facing out.

Cut out all pieces of the box as shown in Details of Box. Assemble box, sand joints smooth, and install the hinges. Paint the base and ladder and the box and knob.

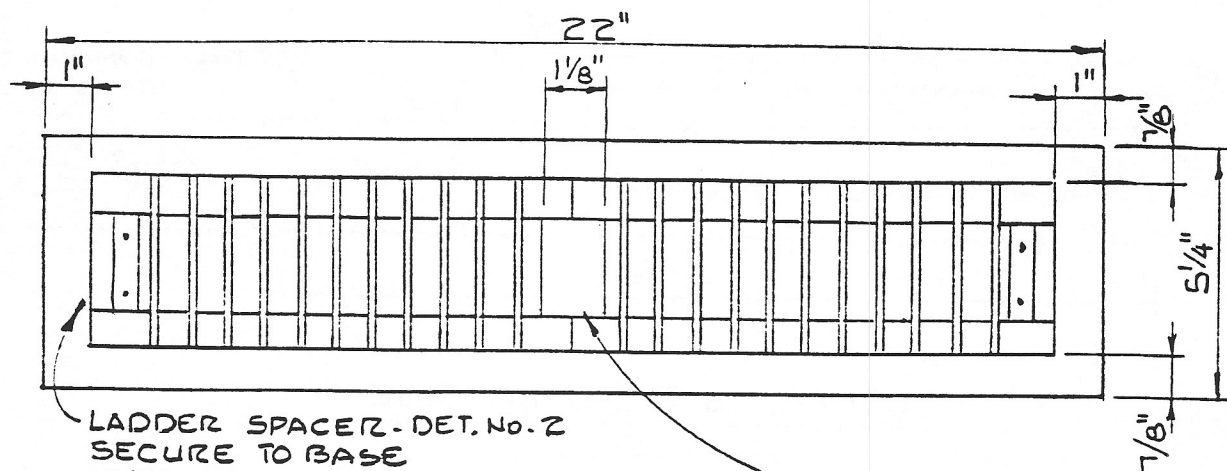
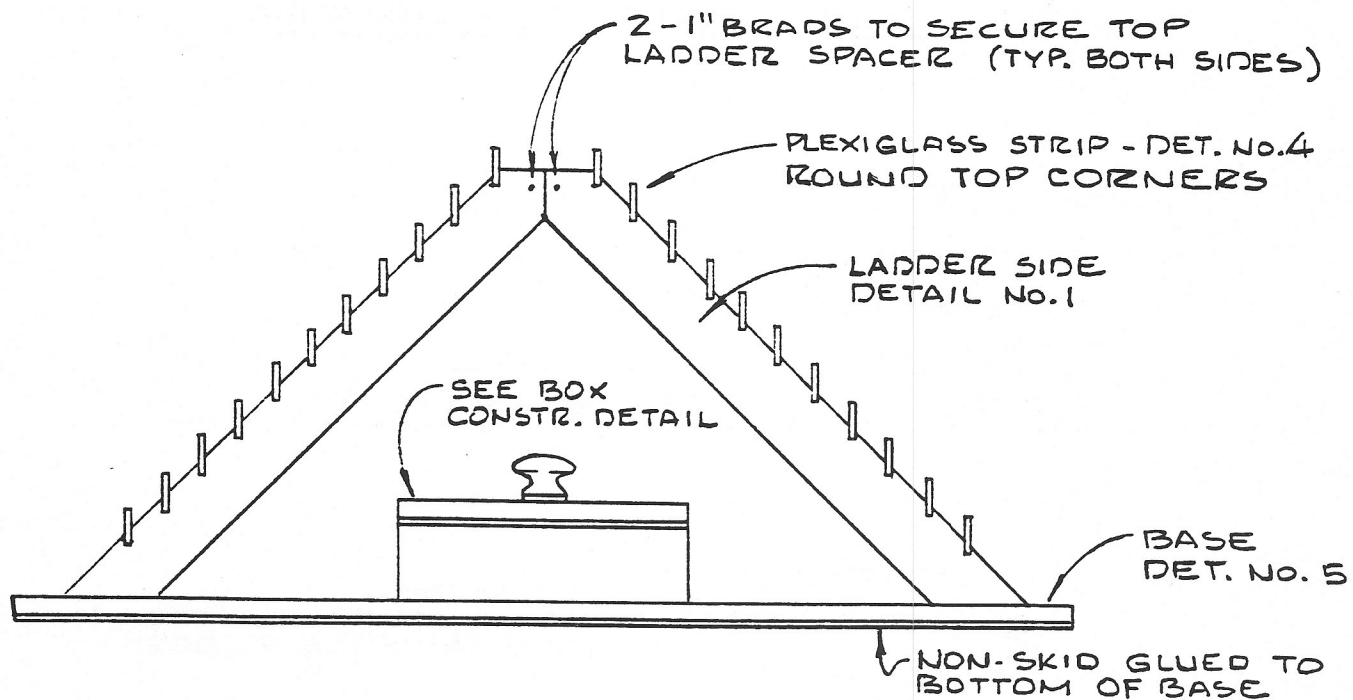
Cut out the dice from solid birch or pieces glued together to 1/8" thickness. Sand the flat areas and round the edges and corners. Locate the holes in the dice: have the two ones opposite each other, the two twos opposite each other, and the two threes opposite each other. Position the holes as on regular dice. Drill holes only 1/16" deep using the brad point drill. Spray paint the dice. When dry, use a tiny brush to paint the holes with a drop or so of black paint. Paint the clothespins to represent characters and, when dry, give them a light spray coating of gloss Varathane varnish to make them easier to clean.

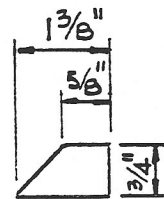
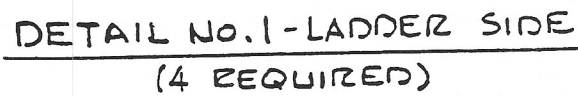
Glue the ladder strips in place. Scrape off the paint under where the box knob will be placed. Glue on the box knob. In a similar manner, glue the box in place under the ladder as shown in Detail No. 5 - Base.

Use contact cement to affix the non-skid material to the underside of the base. Glue the Velcro strips to the box lid and front panel as shown in the Details of Box.

ROUND CLOTHESPIN  
W/ FACE PAINTED ON  
2 REQ'D

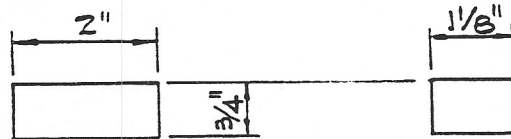


TOP VIEWFRONT VIEW



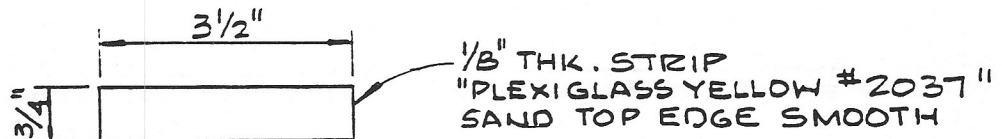
SIDE VIEW

DETAIL No. 2 - LADDER SPACER (BOTTOM)



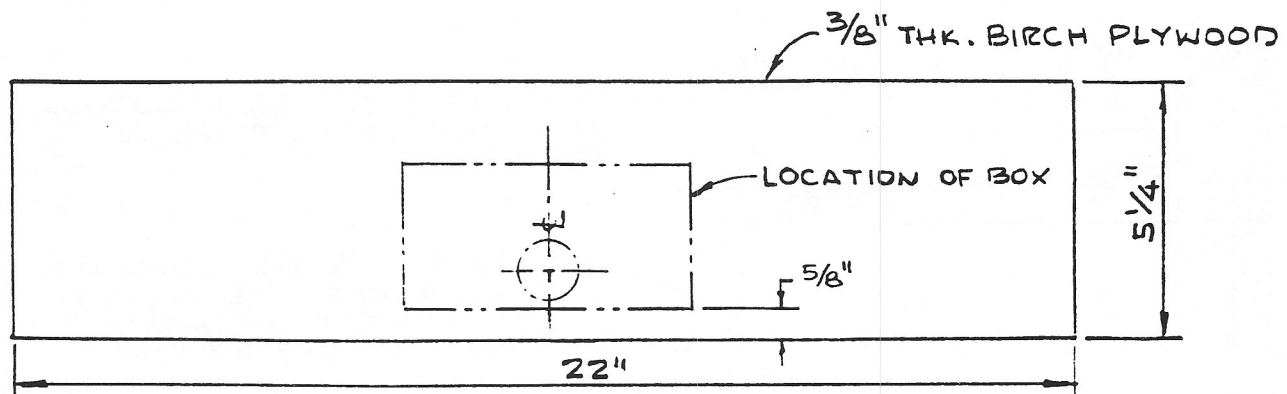
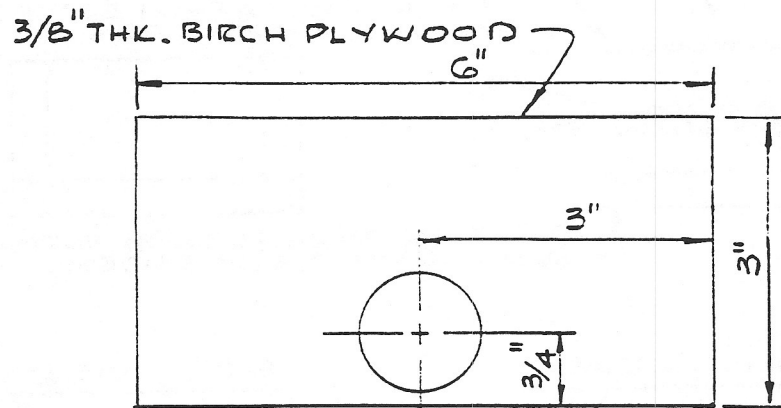
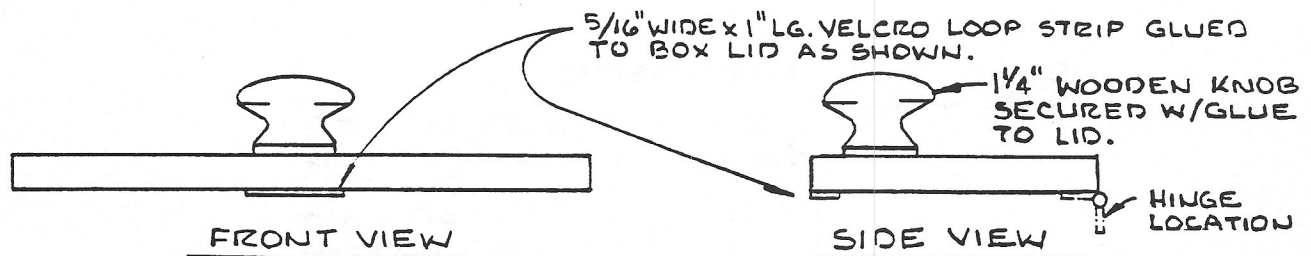
SIDE VIEW

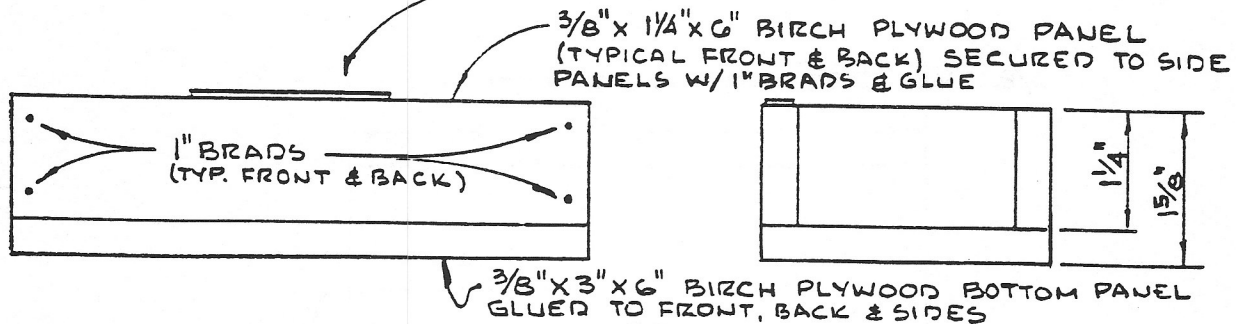
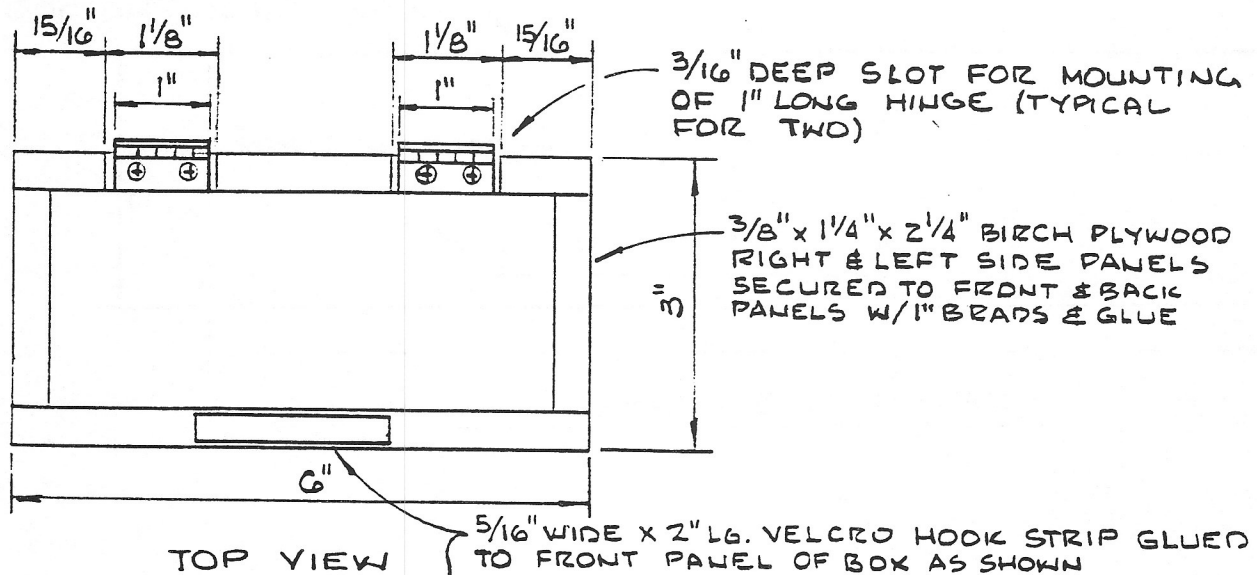
DETAIL NO. 3 - LADDER SPACER (TOP)



DETAIL No. 4 - LADDER STRIP  
(22 REQUIRED)



DETAIL No. 5 - BASETOP VIEWDETAILS OF BOX LID

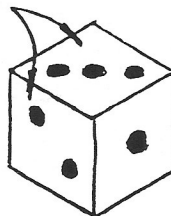


DETAILS OF BOX FOR DICE STORAGE

NOTE:

BOX IS TO BE GLUED TO BASE OF LADDER GAME FOR STORING TWO CLOTHESPIN & 1 PAIR OF DICE

SAME POINTS ON OPPOSITE SIDE OF DICE



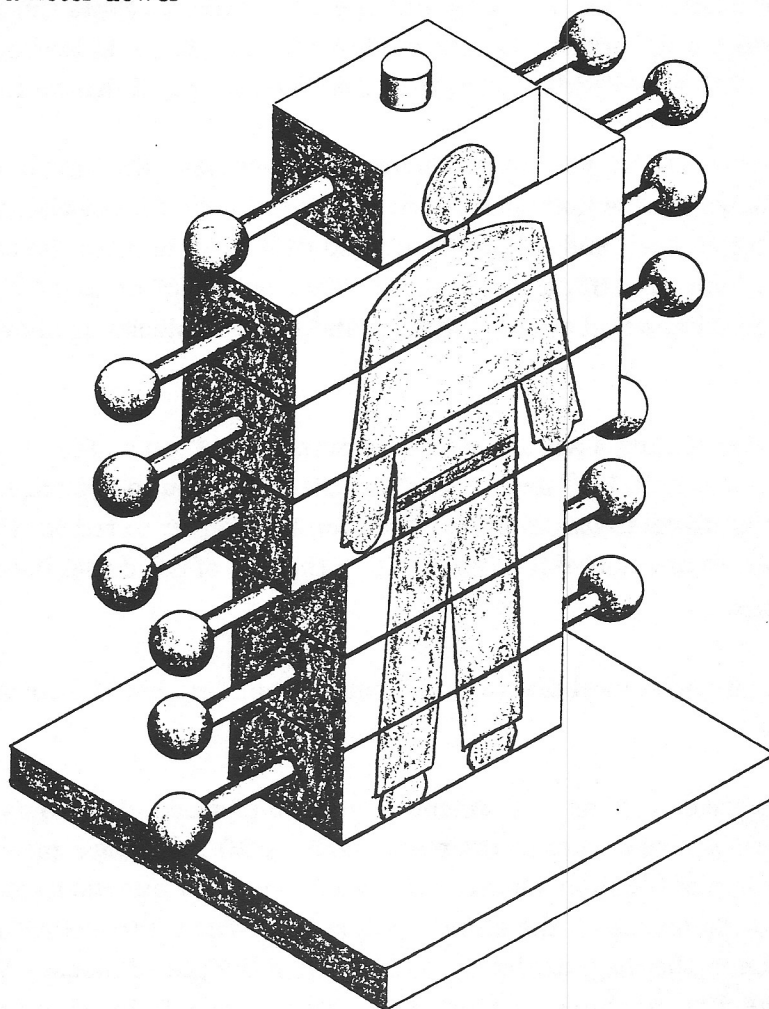
POINTS ON DICE ACHIEVED BY 1/16" DEEP DRILLING W/ 1/4" BRAD-POINT DRILL & COLORING EA. POINT MAX. 3 POINTS

1 1/8" x 1 1/8" x 1 1/2" MAPLE-BIRCH  
DICE (2 REQ'D)

The Body Builder is very simple to make but good fun for a child as the blocks are sorted, sequenced and stacked to complete either the picture of a man or the design of stripes. If it is difficult for a child with a weak grip to manipulate the blocks, adding pegs and knobs to each block will make for easier stacking and just as much fun. The outlines provided for drawing the man are reduced by 20%.

**MATERIALS NEEDED**

- One 7 1/8" x 7 1/8" piece of 3/4" birch plywood
- One 3/4" diameter dowel 11 1/2" long
- 36" of 1 1/2" thick x 2 1/8" side soft pine. This might easily be made of two pieces of 1" lumber. Buy 8 ft of 1" x 6" lumber, which is really 3/4" x 5 1/2". Cut it up to eliminate the knots, then glue together to make the pieces as detailed in the drawings.
- One 8 1/2" x 11" piece of carbon paper
- Elmer's Carpenter's Glue
- One 7 1/8" x 7 1/8" piece of non-skid material
- Varathane gloss varnish
- Contact cement
- One 12" x 5" piece of thin plywood or Masonite
- About 42" of 3/8" diameter dowel



For the alternate design using dowels and balls for "handles":

- About 42" of 3/8" diameter dowel
- 14 - 1" diameter uncolored wooden balls from Cherry Tree Toys, Inc. (See Some Sources of Speciality Items at bottom of Table of Contents.)

### **TOOLS NEEDED**

- Table saw
- Drill press and set of drills, preferably Speedbore drills or brad point drill
- Clamps
- Sander or sanding block and sandpaper
- Band saw or jigsaw
- Brush for varnish and some means for cleaning the brush
- Varathane spray
- An artist's brush and some black paint or a "Uni-PAINT-Marker" by Faber-Castell, which makes a medium width line of oil base black paint

### **CONSTRUCTION SUGGESTIONS**

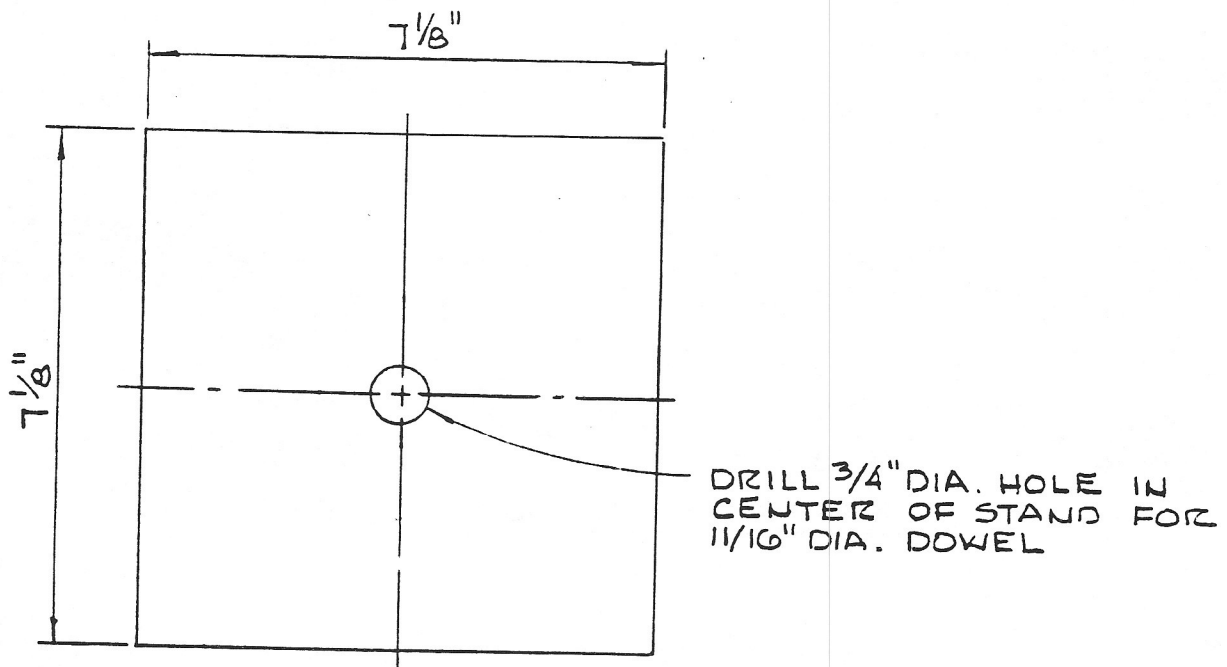
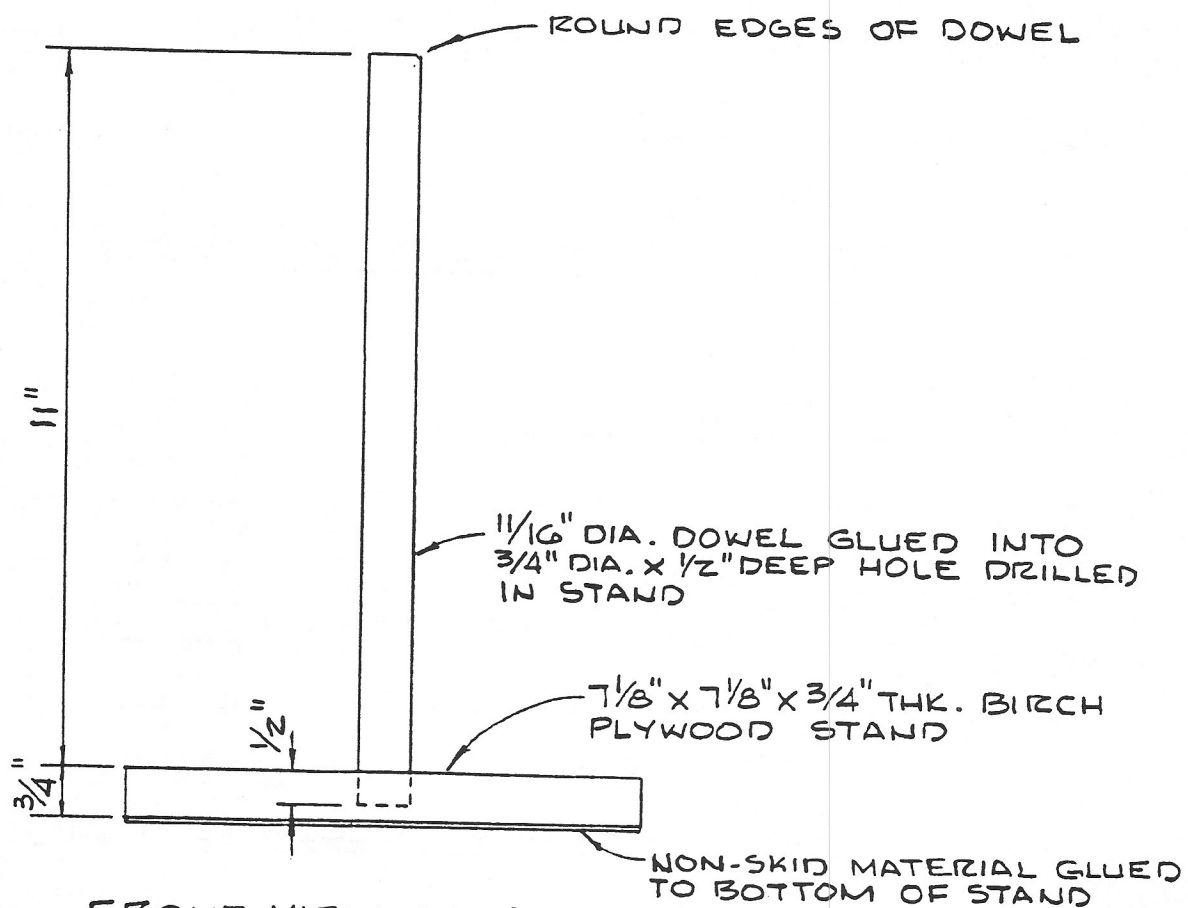
From the soft pine 1" x 6" cut out 2 3/16" wide pieces that are reasonably free of knots, 1" long (make six), 4" long (make six) and 2 7/8" long (make two). Glue the pieces together to make a three 6" blocks, three 4" blocks and one 2 7/8" block. Sand the blocks carefully, rounding the edges and corners. Locate the top centers. To avoid tearing the wood, drill almost through with a 3/4" drill. Then turn the block over and drill in from the bottom.

If the body pieces are to be without dowel and ball "handles", the next step is to apply two coats of varnish. If, however, the body pieces are to be provided with dowels and balls on each side, locate the centers on each end of each block and drill 3/8" diameter holes 1/2" deep. Next, cut 14 pieces 2 1/2" long of 3/8" diameter dowel. Then drill 3/8" holes 1/2" deep into the wooden balls. Finally, glue balls and dowels together and into the blocks as shown in the Detail drawings.

Make the stand by cutting a square of 3/4" plywood 7 1/8" on a side. Locate the center and drill a 3/4" diameter hole 1/2" deep. Sand the piece and round the edges and corners. Cut the 3/4" diameter dowel to length and rotate it on the sander to reduce the diameter by 1/16". Round the edges on one end of the dowel. Glue the end of the dowel not rounded into the hole in the square piece.

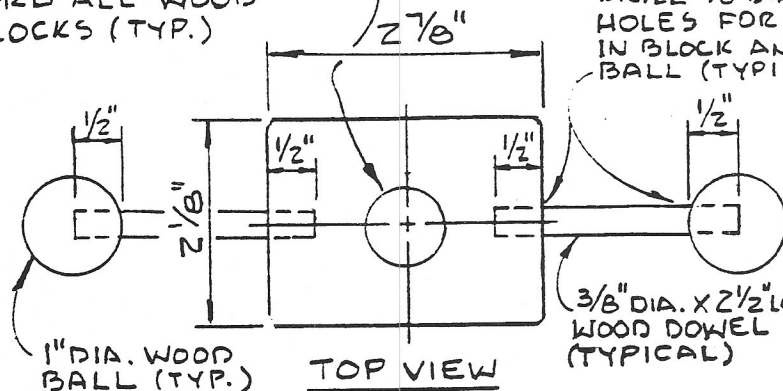
Varnish the stand-with-dowel and affix the non-skid material to the bottom of the stand with contact cement.

Lay a 12" x 5" piece of 1/8" or 1/4" Masonite, or thin plywood, down on a table or workbench at the edge. Enlarge the outline of the man's body by 20%. Using a piece of carbon paper, transfer the outline of the man's body to the Masonite. Saw out the man. Using the man cutout and with the blocks on the stand, outline the man on the blocks with a fineline felt tip pen. Also sketch in the diagonal lines on the back of the pile of blocks. Repaint the outline of the man and the diagonal lines on each piece using an artist's brush and black paint or a Faber-Castell "Uni-PAINT-Marker".

TOP VIEW OF STANDFRONT VIEW OF STAND



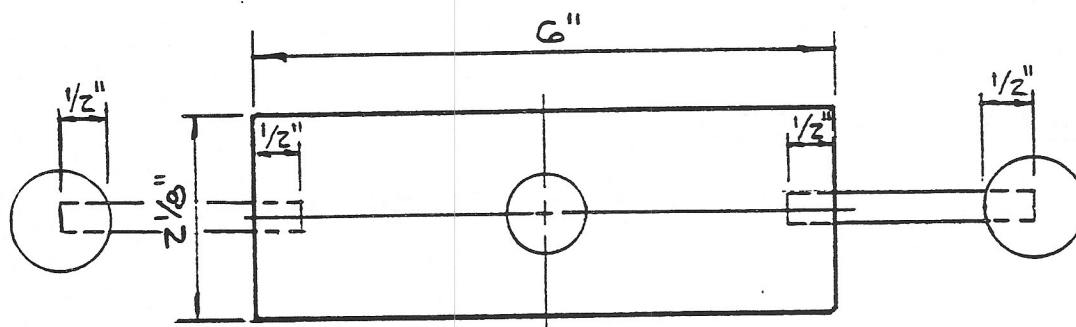
3/4" DIA. HOLE DRILLED  
THRU ALL WOOD  
BLOCKS (TYP.)



TOP VIEW

SIDE VIEW

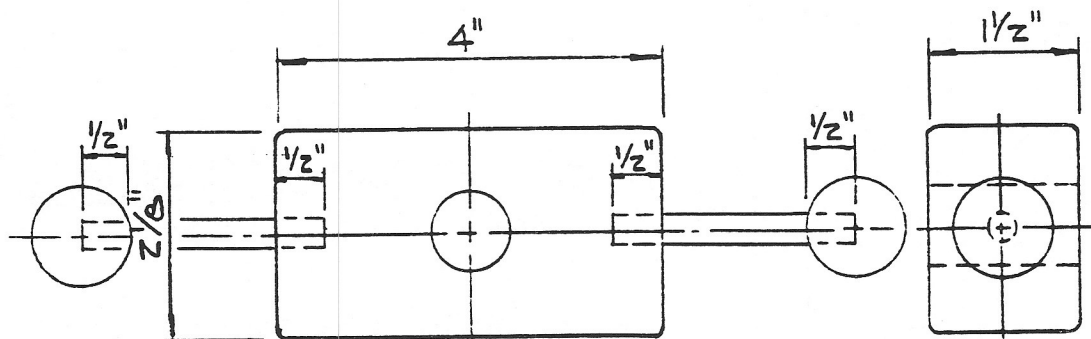
DETAIL OF TOP BLOCK (1 REQ'D)



TOP VIEW

SIDE VIEW

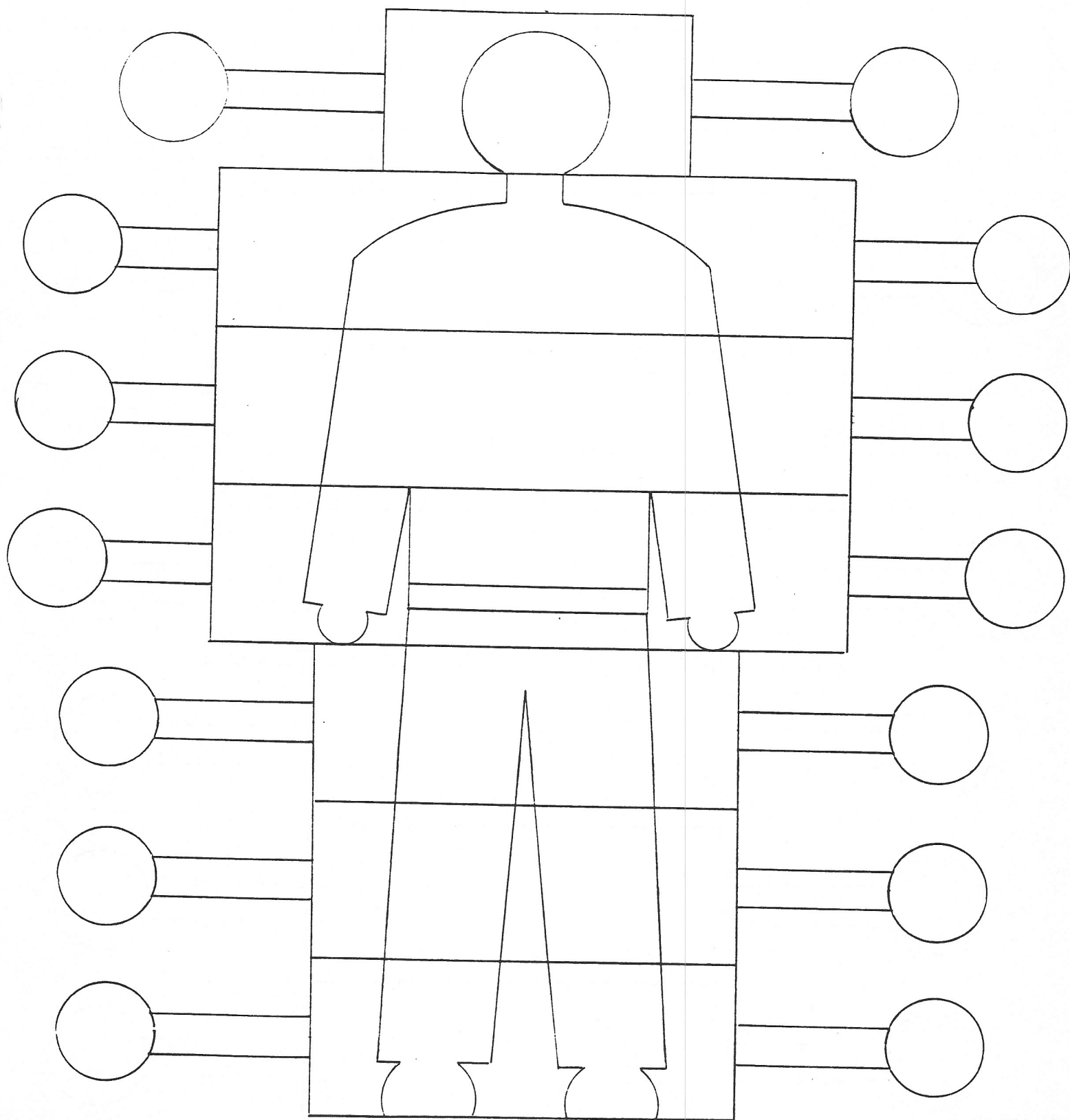
DETAIL OF MIDDLE BLOCK (3 REQ'D)



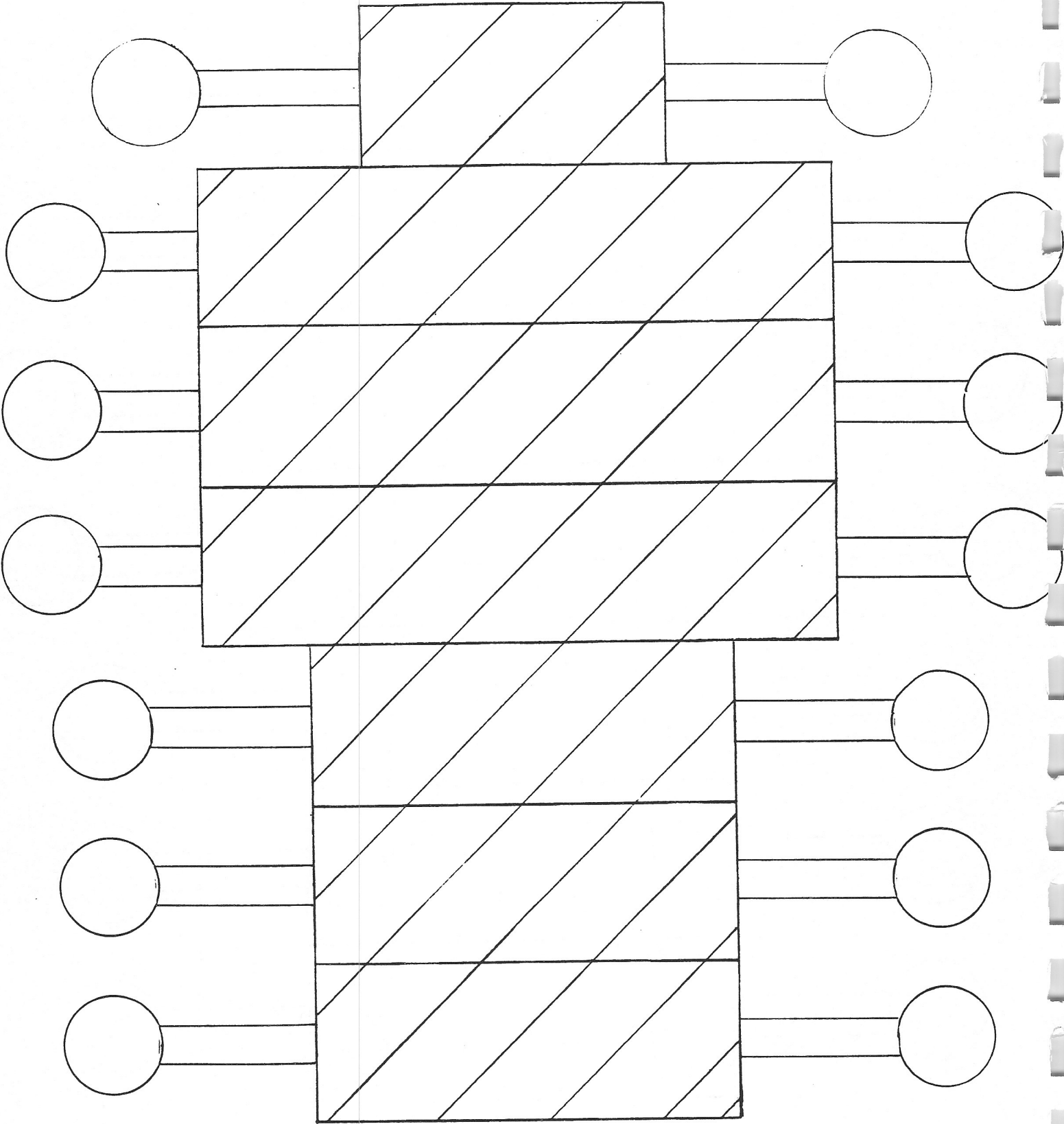
TOP VIEW

SIDE VIEW

DETAIL OF LOWER BLOCK (3 REQ'D)



**Note: Enlarge outline for man's body by 20%.**

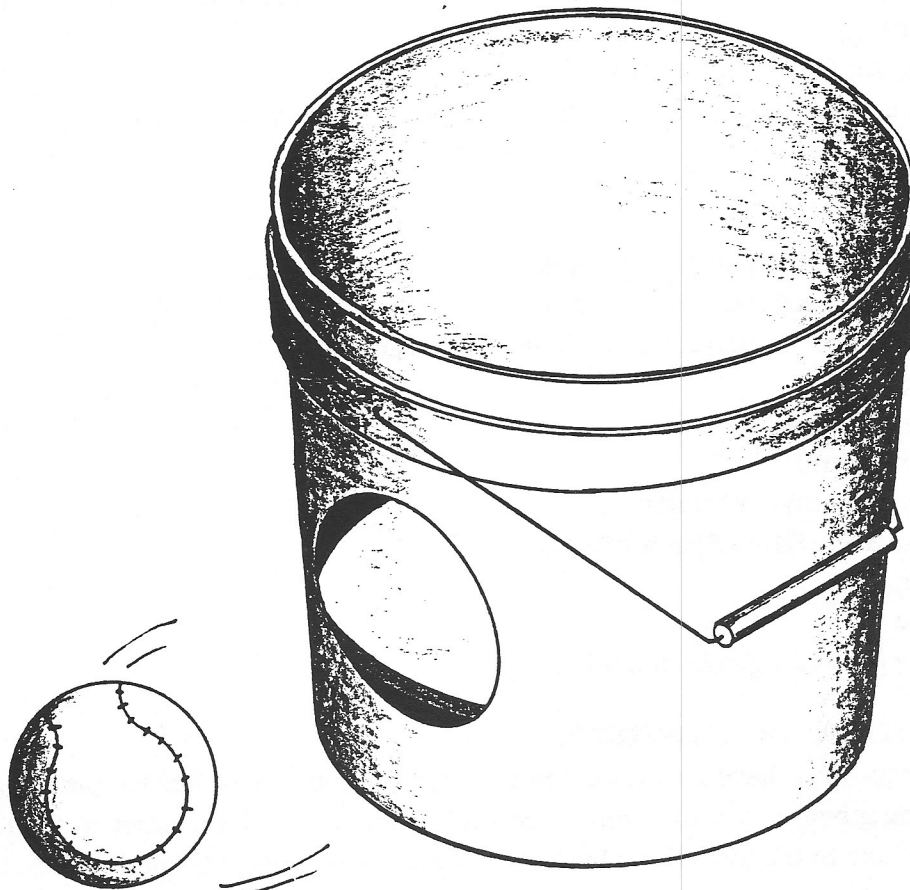


Play involves all of the senses and this particular toy incorporates sound as part of its cause and effect appeal. The Ball/Bag Pitch is versatile in a number of ways. A musical tone results when pressure is placed on the switches inside the bucket. This tone can be elicited for a short amount of time by tossing the ball inside and letting the ball roll out and back to the child. The tone will last a longer time if a bean bag is tossed in and left in until the child retrieves it. The Ball/Bag Pitch can provide a child with gross motor movement and visual and/or auditory perceptual activities from a sitting or standing position.

Constructing this toy should be no major problem for a person familiar and adept with ordinary shop tools. The drawings have detailed dimensions and wiring diagrams. The control board and landing board may need to be altered to fit the particular bucket selected. The bucket should be near the size indicated, reasonably rigid and with a good handle.

**MATERIALS NEEDED**

- One rigid, plastic bucket, 9 1/8" tall, 9 1/8" ID of top and 8 1/8" ID of base (If different size bucket is used, other dimensions should be adjusted accordingly.)
- One 3 1/2" diameter ball
- One bean bag, approx. 4 1/2' x 2 1/2"
- One 12" x 35" piece of 1/4" plywood for two disks, per prints



- One 3/4" x 5/8" piece of white pine, or equal, 6" long as shown in Bottom View of Control Board Assembly
- One 13/16" x 1 1/8" piece of white pine or equal, 6" long as shown in Detail Nos. 2, 3, and 4
- One 5/16" x 7/8" piece of white pine, or equal, 30" long (Roller switch frame and ON-OFF Switch mount)
- One 5/16" x 1 3/16" piece of white pine, or equal, 18" long (Battery enclosure)
- One 1/2" x 9" strip of .010" thickness Beryllium copper, or equal, spring material to be cut for four support springs (Detail No. 5)
- Six roller lever switches, Radio Shack #275-017
- Tri-sound siren, Radio Shack #273-072
- Battery holder, 2 "C" cells, Radio Shack #270-385
- OFF-ON switch, Radio Shack #275-401
- Wire, 22 gauge in black, green and red, Radio Shack #278-1296
- Two "C" size batteries, Radio Shack, Duracell or Energizer
- Four round head wood screws #4 x 1"
- Pan head sheet metal screws: #4 x 3/4" - 4  
#6 x 1/2" - 5  
#6 x 3/8" - 2  
#4 x 5/8" - 4
- Round head machine screws #2 - 56 x 3/4" - 4  
#2 - 56 x 1" - 4
- 1/16" plastic sheet 3" x 3 1/4" for battery compartment cover (may be obtained from heavy plastic container, jug, etc.)
- Lead-free paint for landing board
- 2" x 2" piece of 1/16" vinyl foam sheet, or equal for siren speaker cover

### **TOOLS NEEDED**

- Table saw
- Band saw (power) or coping saw (hand)
- Electric drill and selected drill bits sizes
- 1 1/4" hole saw or adjustable wood auger and brace
- Screwdriver
- Metal shears (tin snips)
- Pliers and wire cutter
- Soldering iron - small 30 watts
- Resin core solder, Radio Shack #64-002
- Wood Glue
- Five Minute epoxy
- Sharp knife for cutting hole in bucket

### **CONSTRUCTION SUGGESTIONS**

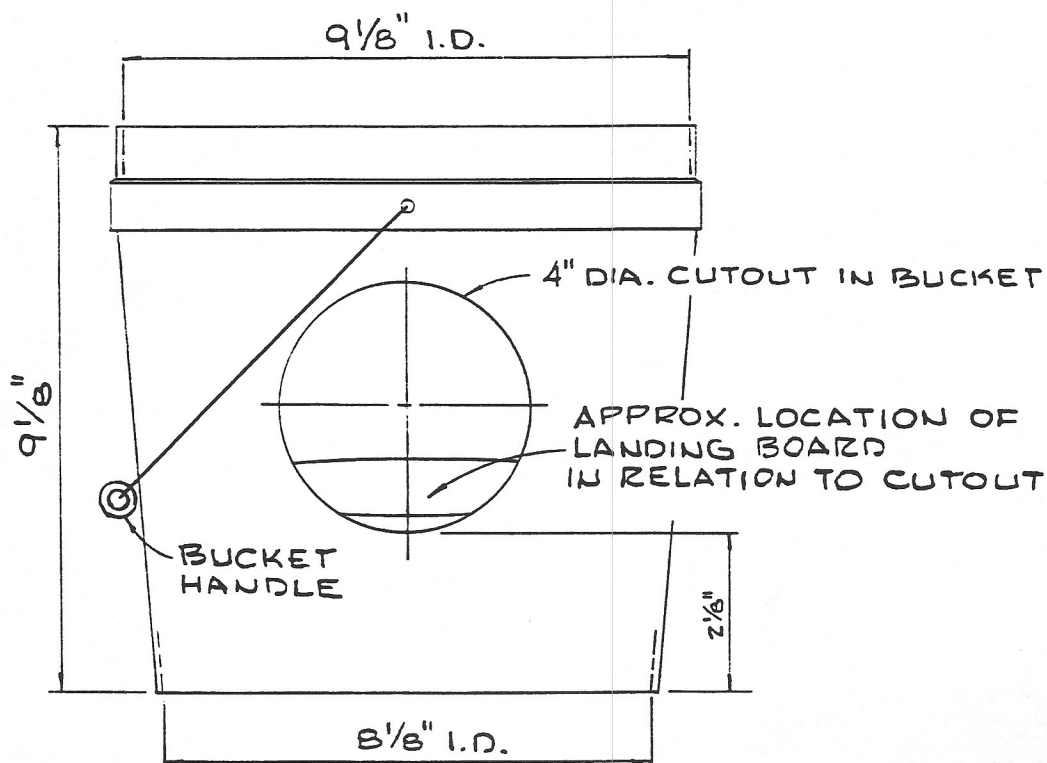
This toy may appear to have a complicated mechanism, but it is rather simple in operation. The tilted landing board, mounted on the control board, should be positioned to allow the ball to roll out the hole in the side of the bucket. Note that this hole is located so that the bucket handle does not interfere.

Having completed the control board, position it in the bucket to allow the landing board to be in proper alignment with the hole in the side of the bucket. The control board diameter should be such as to close off the bottom area of the bucket. The landing board diameter should allow free movement on the supporting springs and move easily on the retaining screws. This will obviously be a "cut and try" operation. Also, the hole in the bucket may require some adjustment to let the ball roll out freely.

In assembling the control board, take care to mount the roller switches so that the rollers are all an equal distance above the frame. When wiring this device, all connections must be soldered to insure proper operations. Because low voltage (3 volts) and very low current are being used, all connections must be secure. By using color coded wire, the task is much easier.

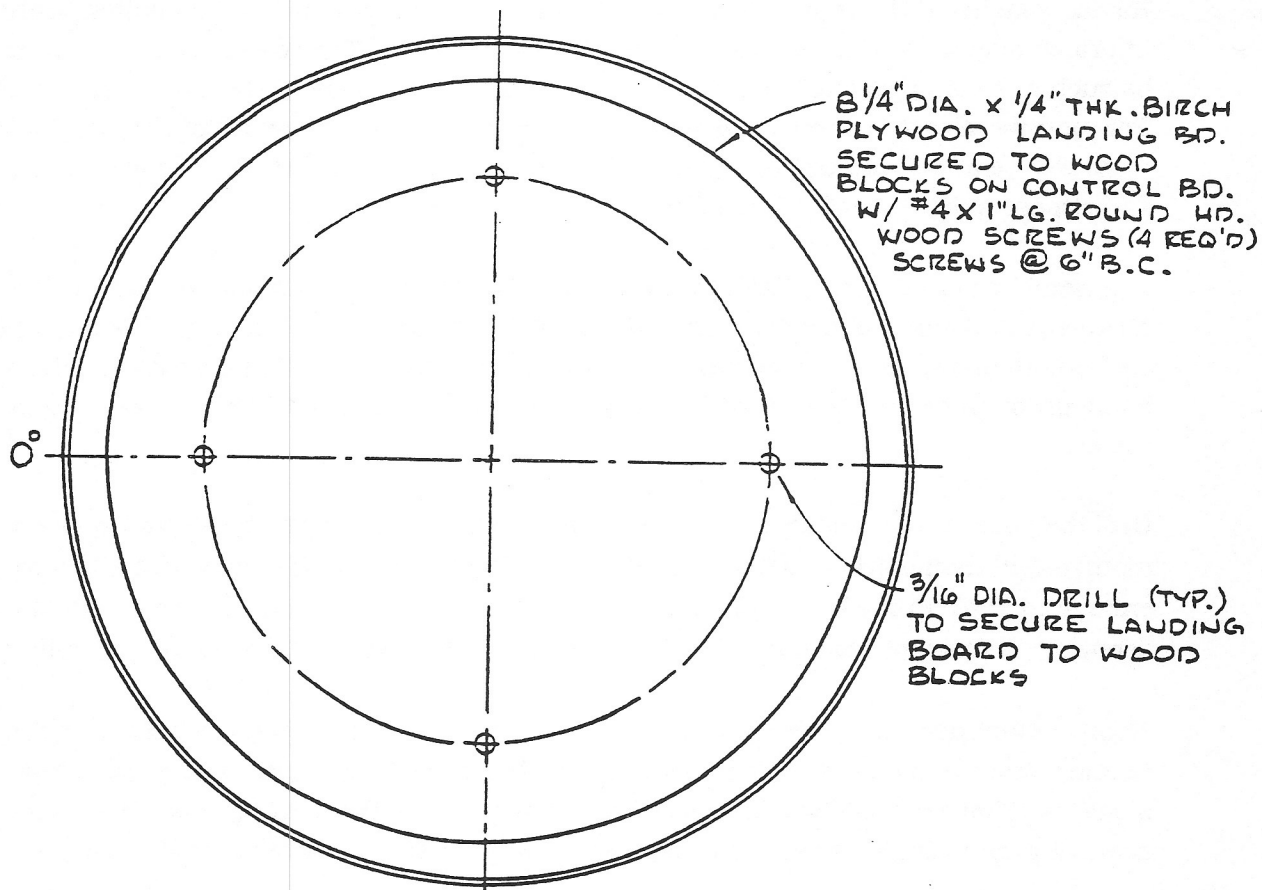
Drill the holes in the landing board. Place the board in the bucket on the control board mounts and then mark for screw holes in the support mounts. It may be necessary to slightly enlarge the hole in the landing board to allow it to "float" freely on the screws. The "fourth screw" at the bucket hole position should be left out, since it will impede the ball rolling out.

A final adjustment of the support springs will be necessary to allow proper movement of the landing board and operation of switches as the ball rolls across and out the hole. It is suggested that the control board and all wood parts below the landing board have one or two coats of polyurethane varnish and that the landing board be painted a bright color.

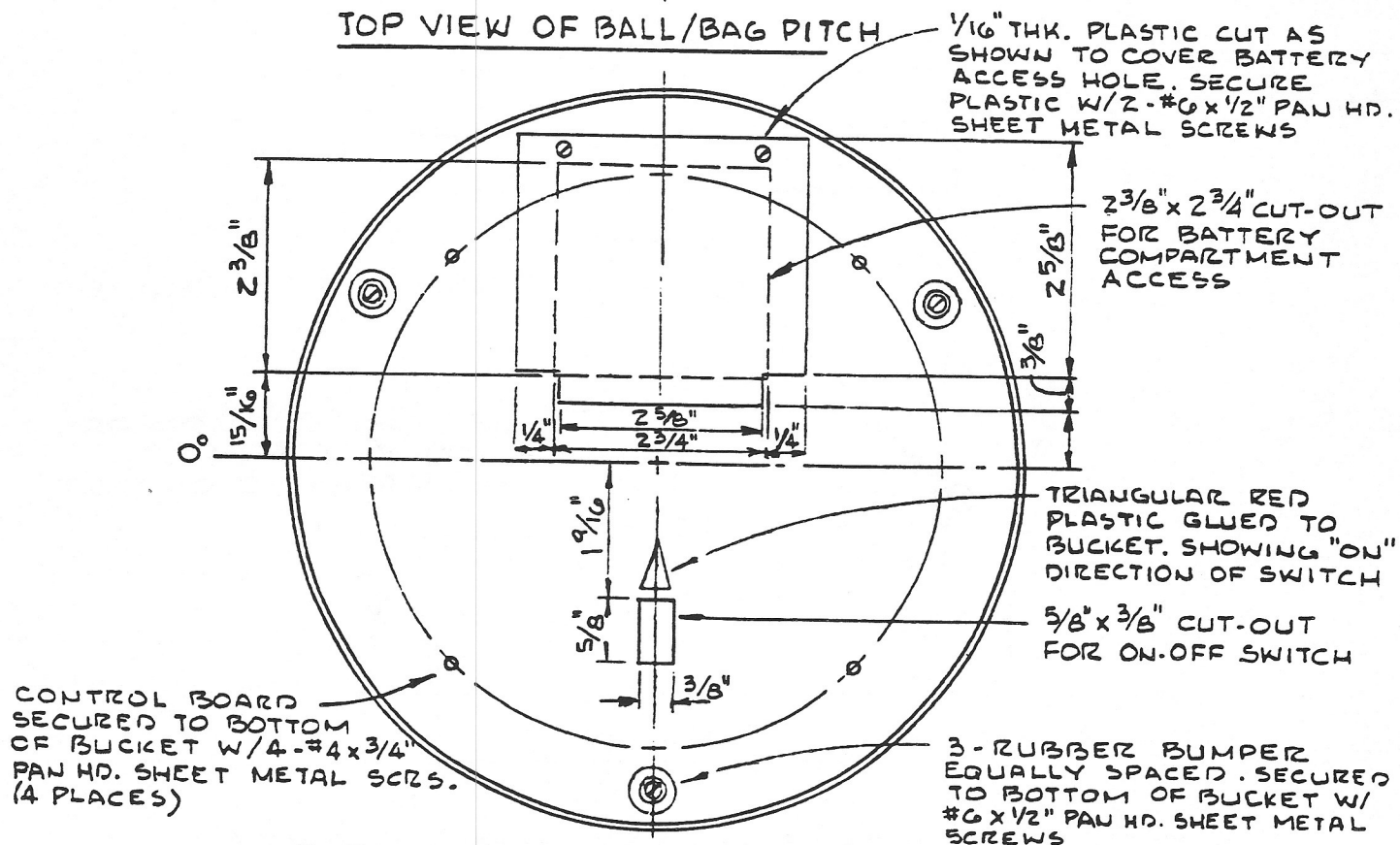


FRONT VIEW OF BALL/BAG PITCH BUCKET

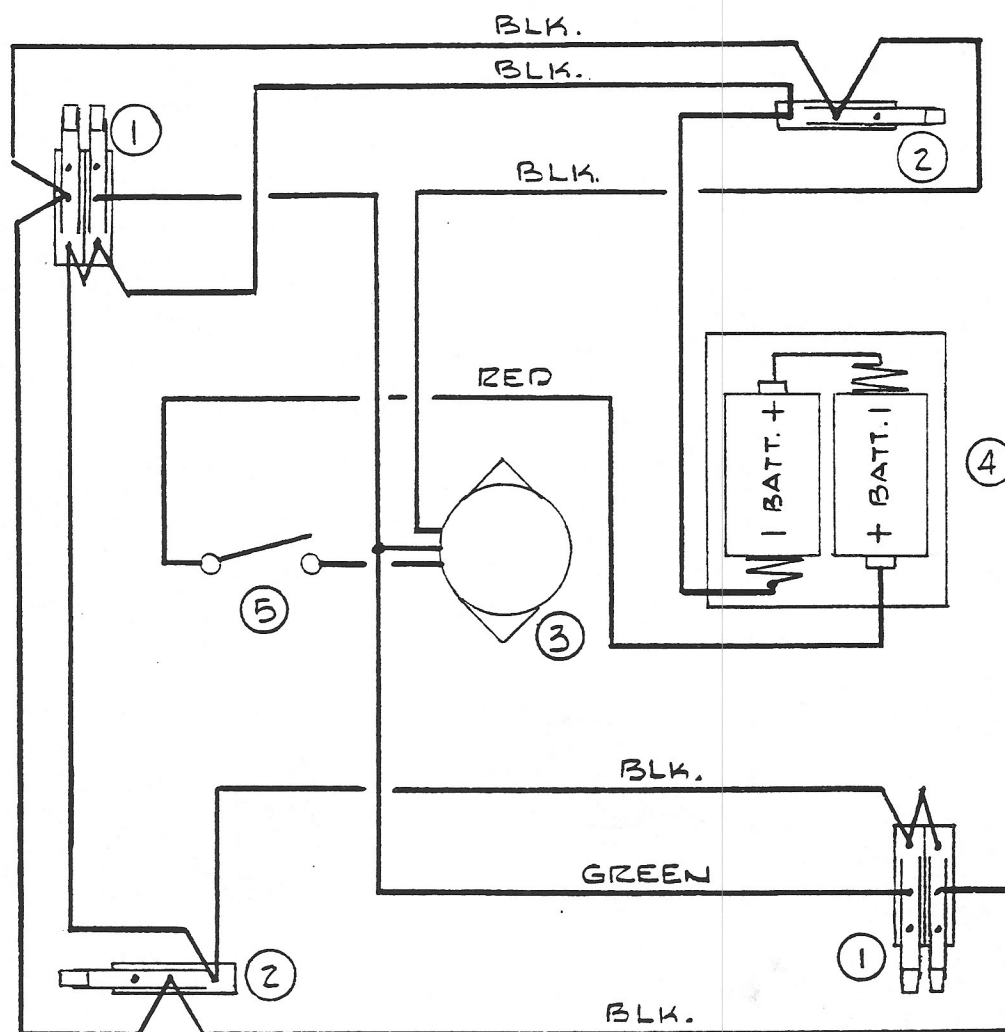


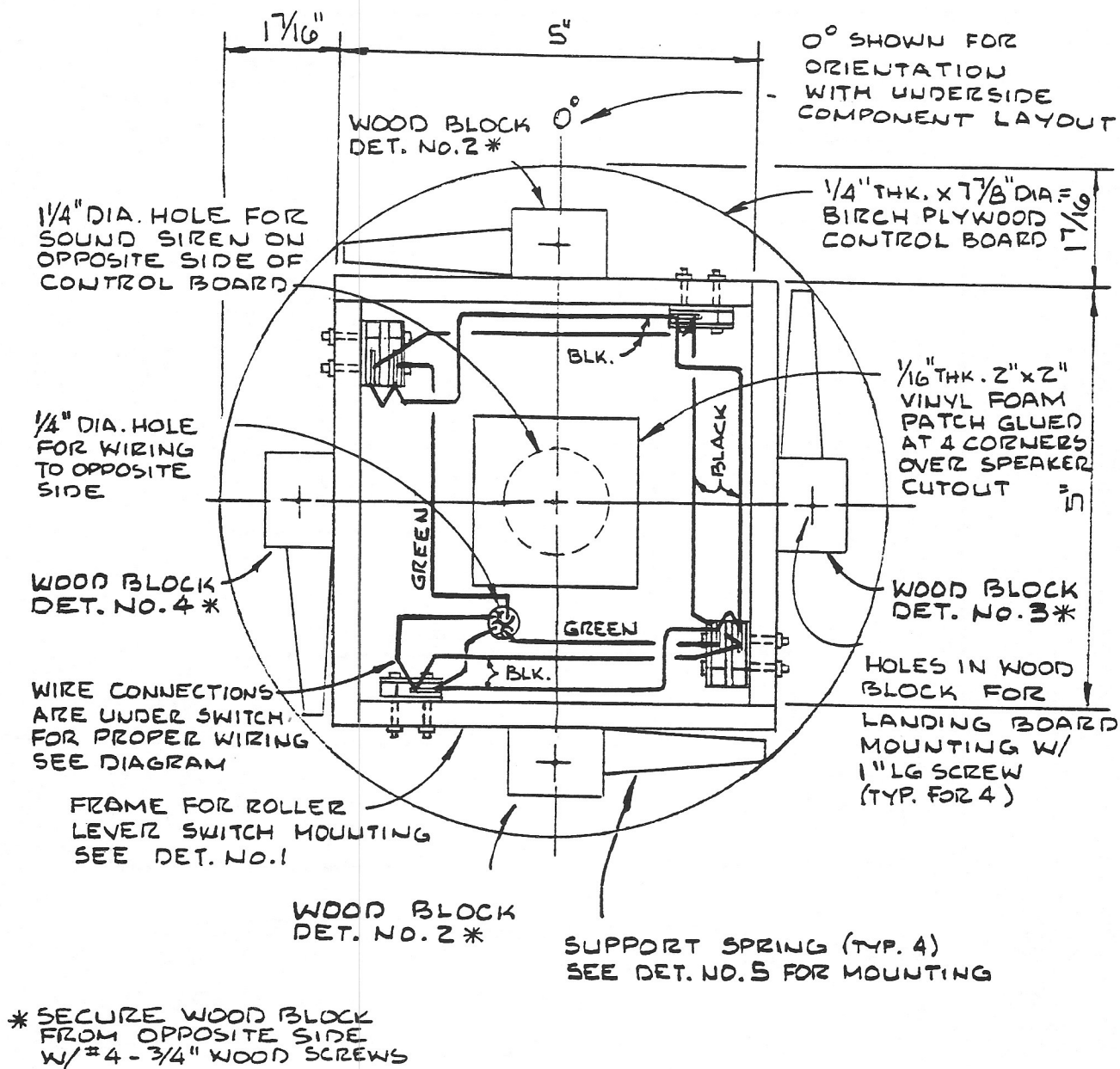


TOP VIEW OF BALL/BAG PITCH

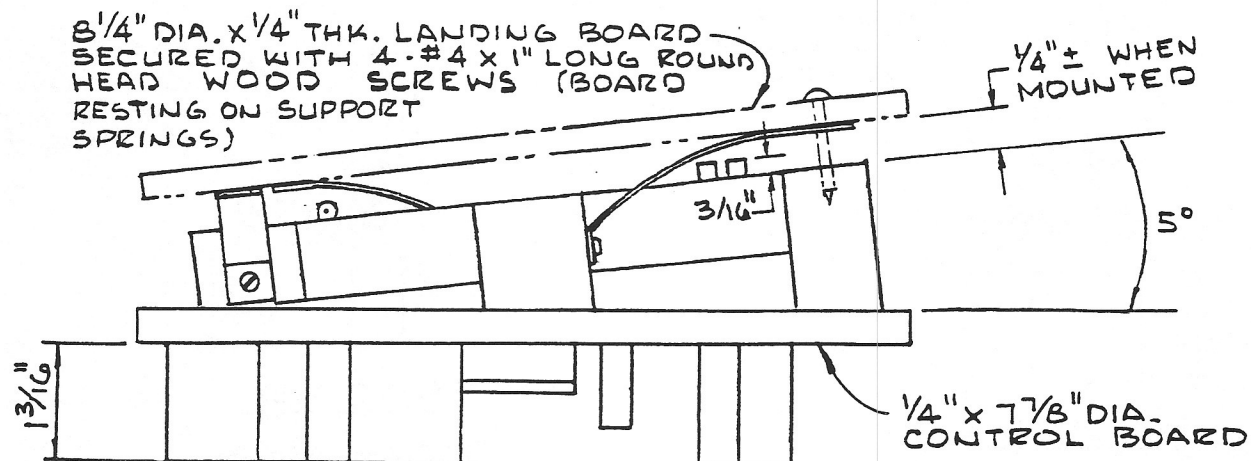
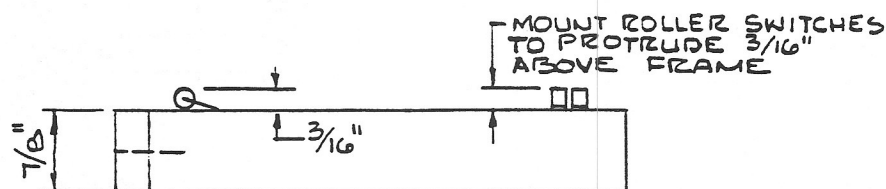
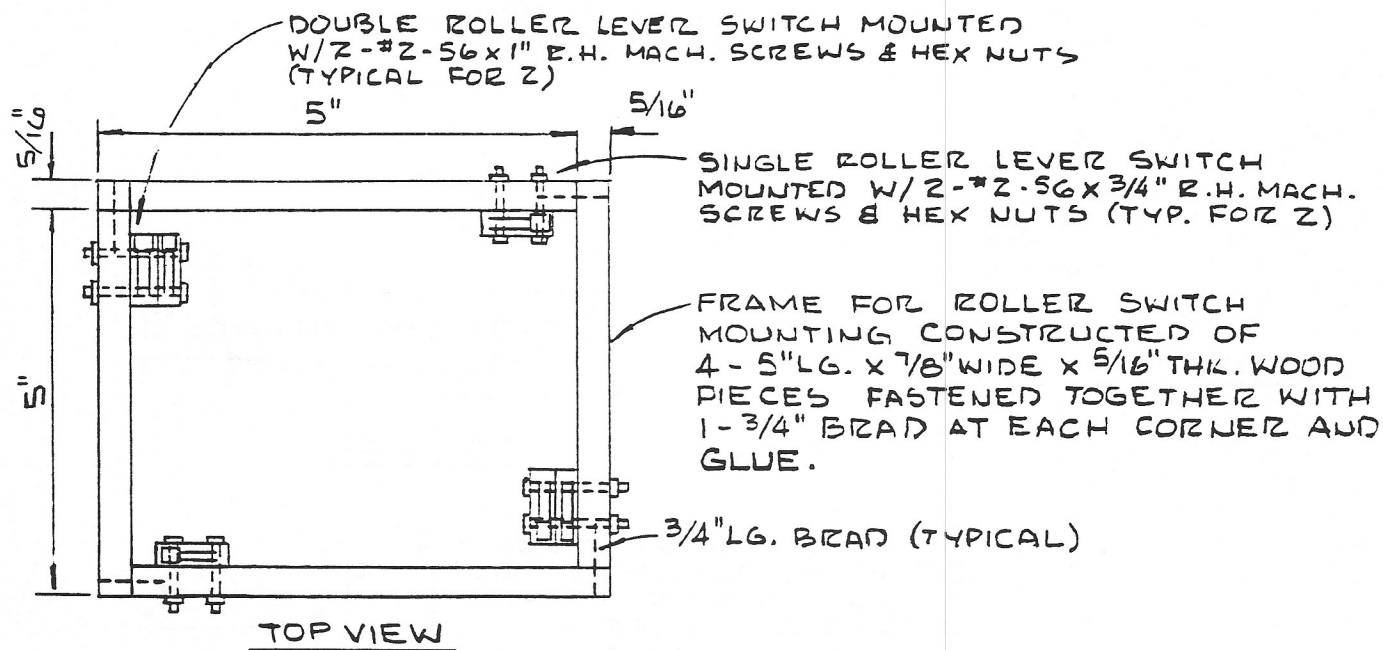


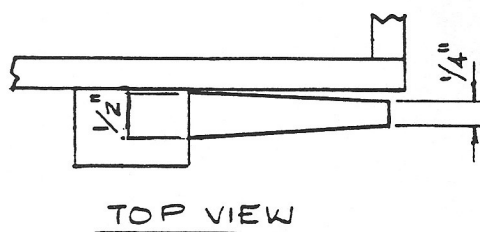
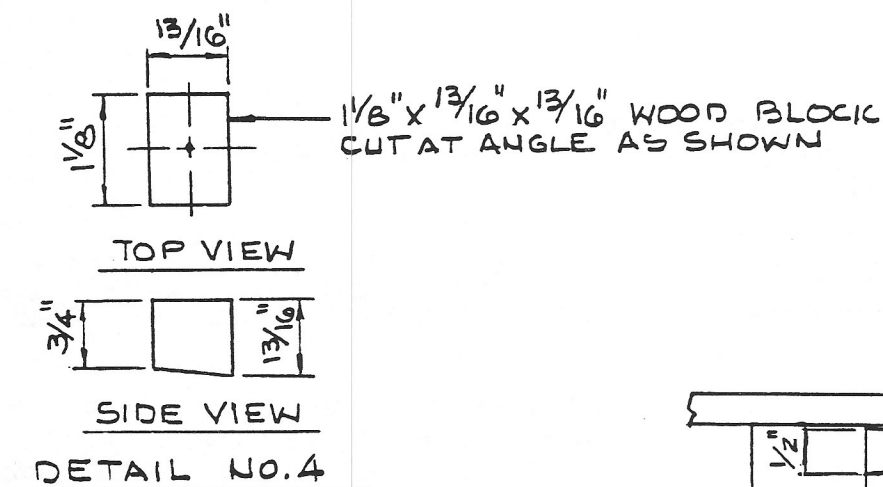
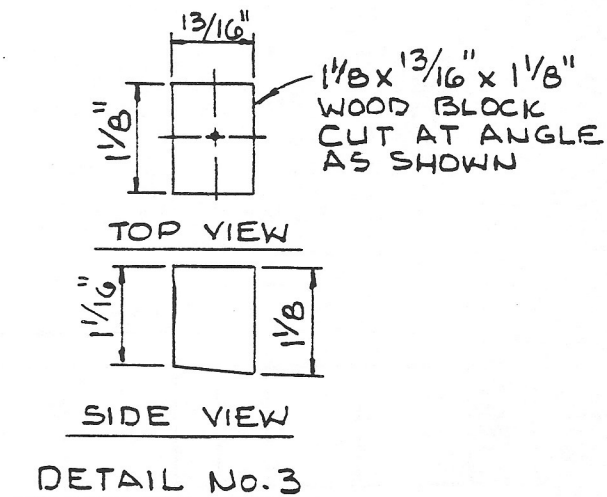
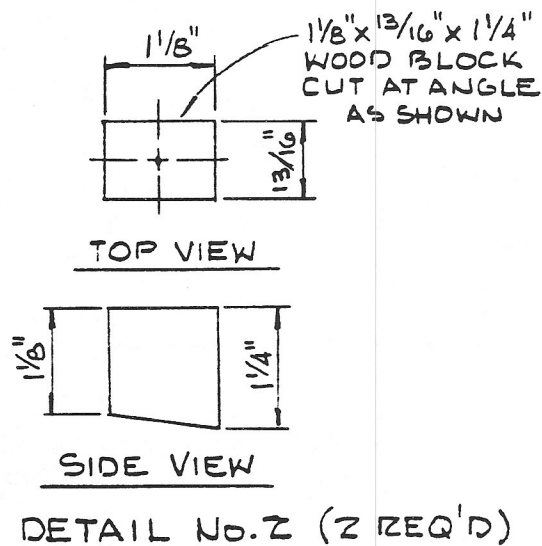
BOTTOM VIEW OF BALL/BAG PITCH



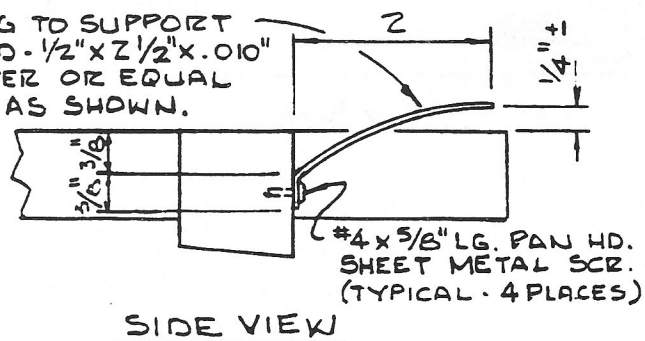


TOP VIEW OF CONTROL BOARD ASS'Y.  
(SHOWN WITH LANDING BOARD REMOVED)

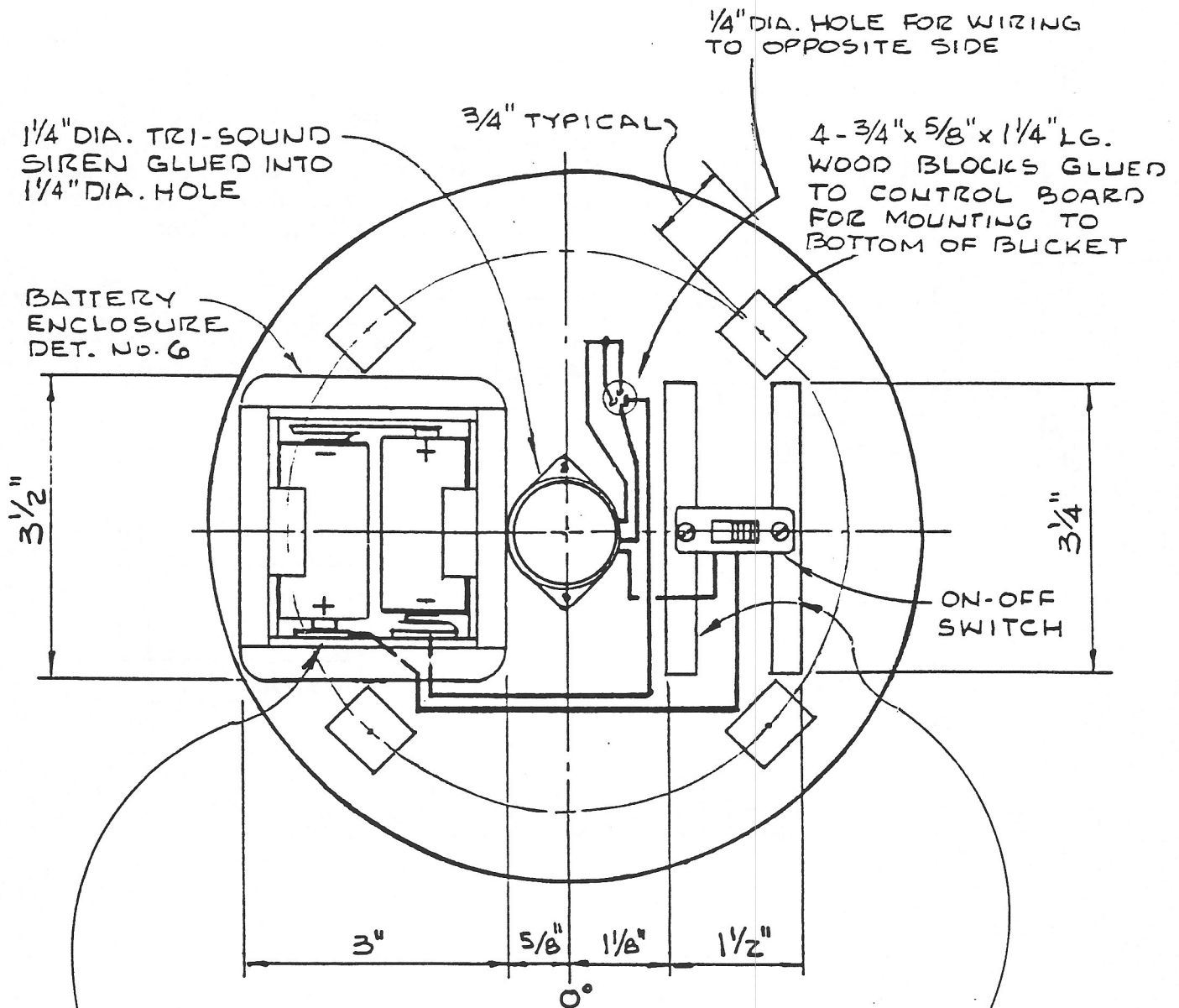
SIDE VIEW OF CONTROL BOARD ASSEMBLYSIDE VIEWDETAIL NO. 1



SUPPORT SPRING TO SUPPORT LANDING BOARD - 1/2" x 1/2" x .010" BERYLIUM COPPER OR EQUAL SHAPED & CUT AS SHOWN.



DETAIL No. 5 (TYPICAL FOR 4)  
SUPPORT SPRING MOUNTING DETAIL



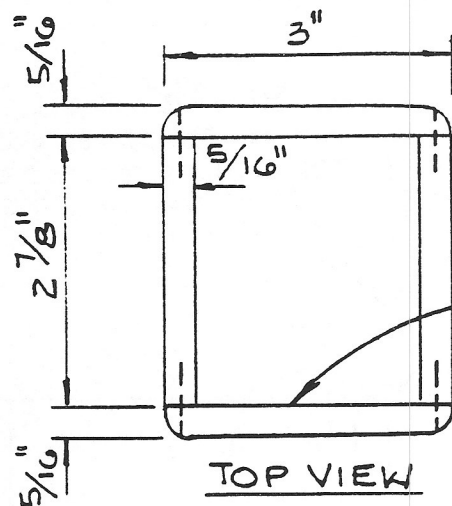
0° SHOWN FOR ORIENTATION  
WITH OPPOSITE SIDE OF  
CONTROL BOARD LAYOUT

SECURE BATTERY  
HOLDER WITH 2  
#6-1/4" PAN HD.  
SHEET METAL SCR'S.  
TO CONTROL BOARD.  
BEFORE FASTENING  
BATTERY HOLDER  
SECURE WOOD  
BLOCK ON OPPOSITE  
SIDE W/ 4-3/4" LG.  
WOOD SCREW

TWO PIECES OF  
3/4" x 7/8" WIDE x 5/16" THK  
GLUED TO CONTROL  
BOARD FOR ON-OFF  
SWITCH MOUNTING.  
ON-OFF SWITCH  
SECURED TO WOOD  
W/ 2-#6 x 3/8" LG. PAN  
HD. SHEET METAL SCR'S.

BOTTOM VIEW OF CONTROL BOARD ASSY

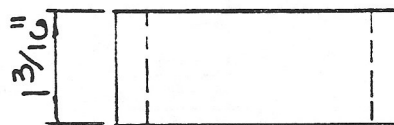




ENCLOSURE FOR DOUBLE "C"  
BATTERY HOLDER ASSEMBLED  
WITH 4-3/4" BRADS AT EACH CORNER  
AND GLUE. ENCLOSURE GLUED TO  
PLYWOOD CONTROL BOARD.

MATERIAL FOR BATTERY HOLDER  
ENCLOSURE IS BIRCH WOOD.  
2 PIECES 2 7/8" X 1 3/16" X 5/16" THK.  
2 PIECES 3" X 1 3/16" X 5/16" THK.

TOP VIEW



SIDE VIEW

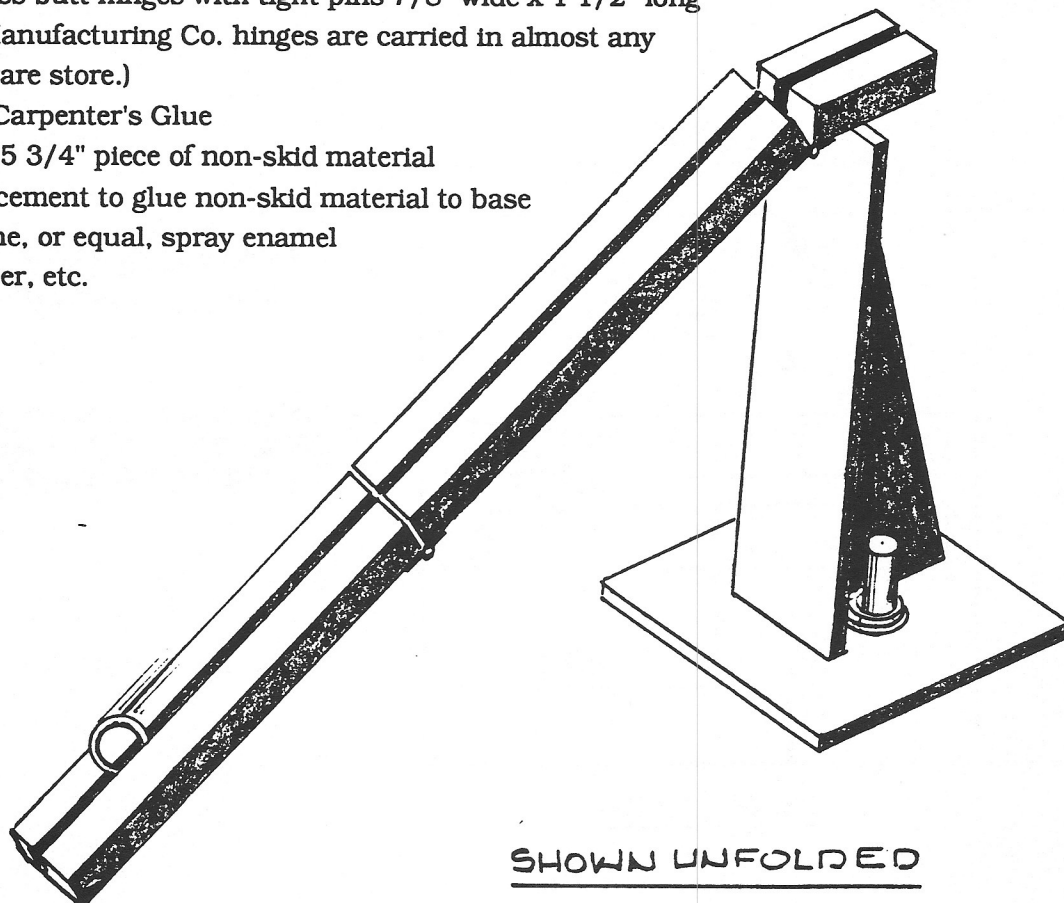
DETAIL NO. 6  
BATTERY HOLDER ENCLOSURE

For some children, rolling a ring or disk down a ramp is difficult since the ring starts its descent before the child can securely grasp it and control the release. In the Ramp with Rings, the small platform at the top of the ramp allows the child to stabilize the ring before giving it a push down the ramp. In addition, the groove in the ramp is deep in order to hold the ring stable, allowing the time a child with special needs many need to get into position to push the ring on down the ramp. And chasing those rings will give him or her plenty of gross motor activity!

Making this toy requires only modest skills.

**MATERIALS NEEDED**

- One 13" x 3 1/2" piece of 3/4" birch plywood cut to sizes for ramp track pieces as shown in drawings
- One 16 1/4" x 5 3/4" piece of 3/8" birch plywood cut to sizes for upright as shown in drawings
- One 2" x 5/8" diameter dowel for ring storage
- Four wooden rings as described on the drawings and obtained from Cherry Tree Toys, Inc. (See Some Sources of Specialty Items at bottom of Table of Contents.)
- 2" of 1" wide hook Velcro and 3/4" long of 1" wide loop Velcro
- Two brass butt hinges 7/8" wide x 1 1/2" long
- Seven 1" x #7 brads
- Two brass butt hinges with tight pins 7/8" wide x 1 1/2" long (Brainerd Manufacturing Co. hinges are carried in almost any large hardware store.)
- Elmer's Carpenter's Glue
- 5 3/4" x 5 3/4" piece of non-skid material
- Contact cement to glue non-skid material to base
- Varathane, or equal, spray enamel
- Sandpaper, etc.



SHOWN UNFOLDED

**TOOLS NEEDED**

- Table saw
- Sander
- Hammer, ruler, square, screwdriver, etc.
- Drill press or electric drill and set of drill bits

**CONSTRUCTION SUGGESTIONS**

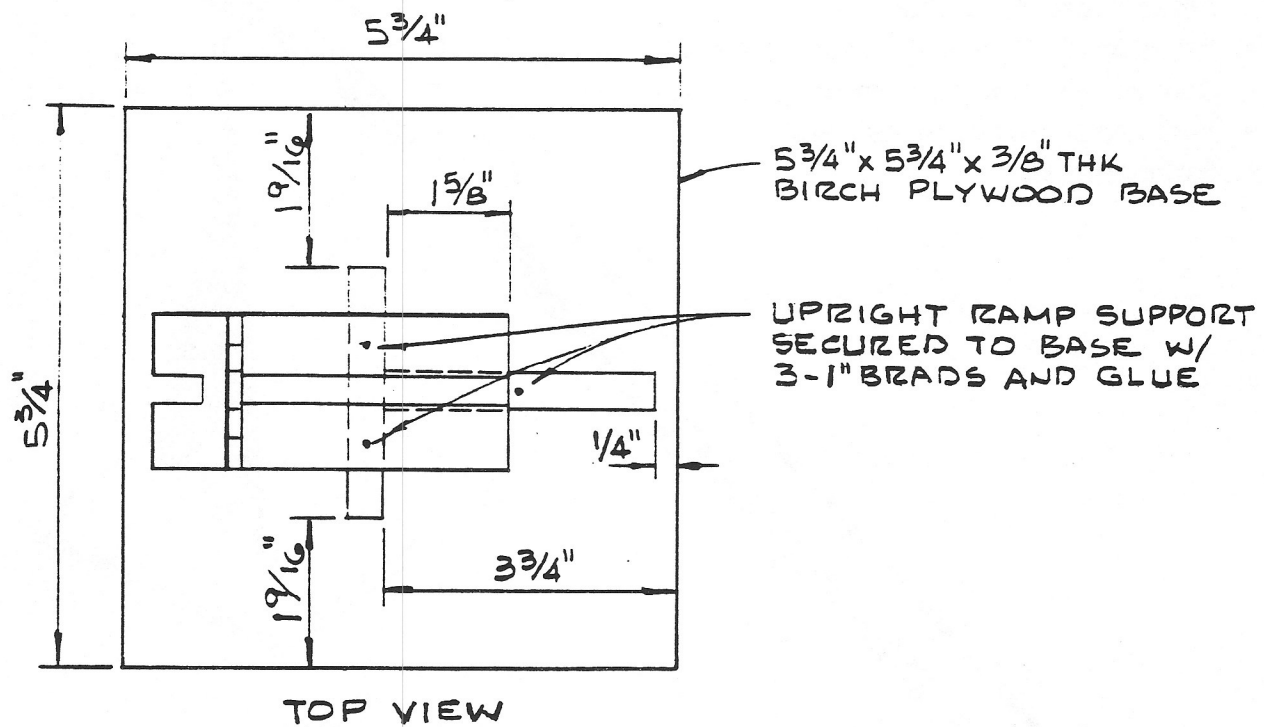
Cut out the base piece, the upright piece and the triangular support piece. Sand them and assemble, as shown on the drawings, with glue and brads.

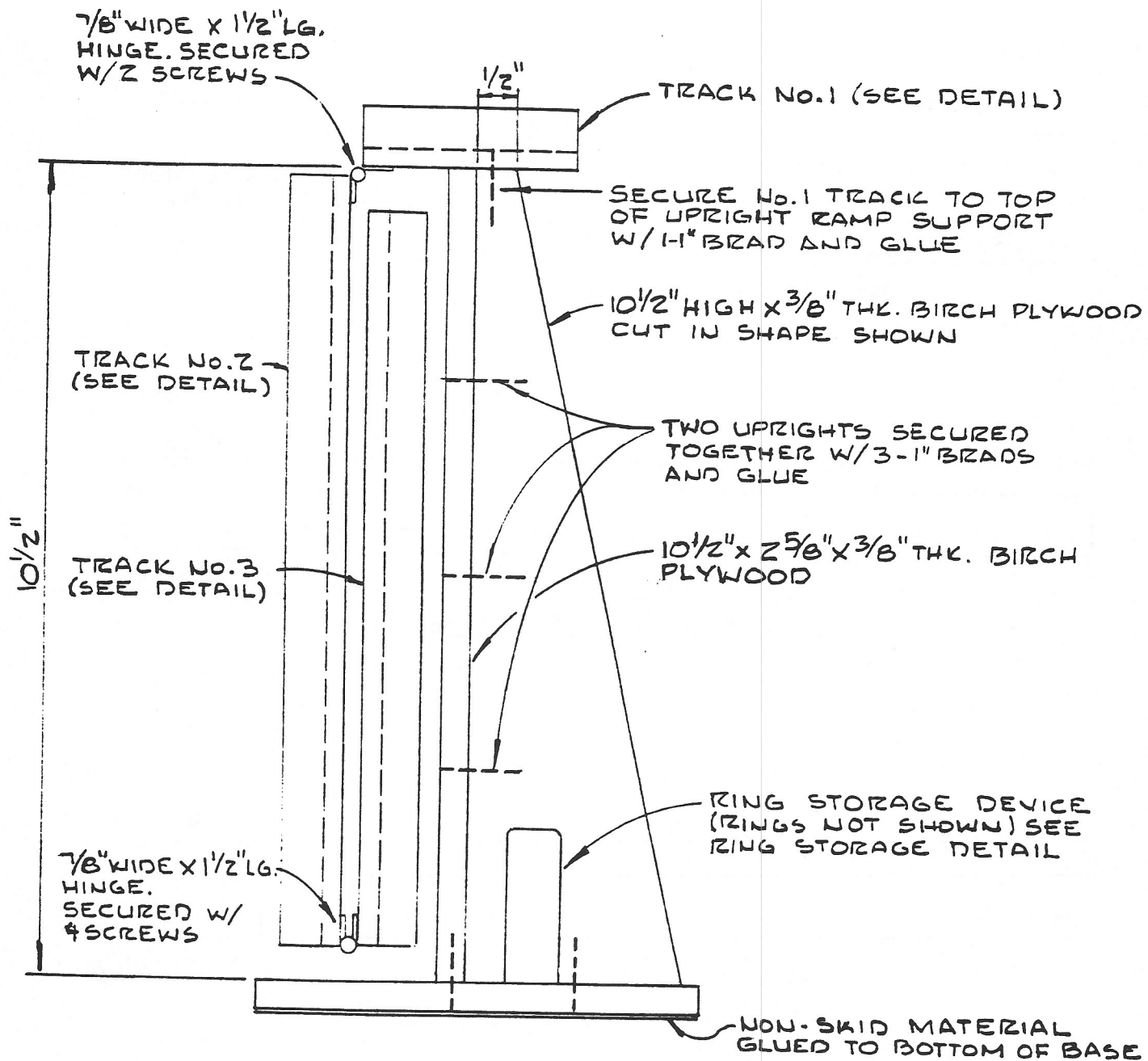
Cut out the three ramp pieces and cut out the slot in each. Sand all pieces carefully. Assemble with hinges as shown.

Cut the ring storage dowel and round the edges of one end. Locate where the dowel will be placed. Use glue and a brad to fix the dowel to the base.

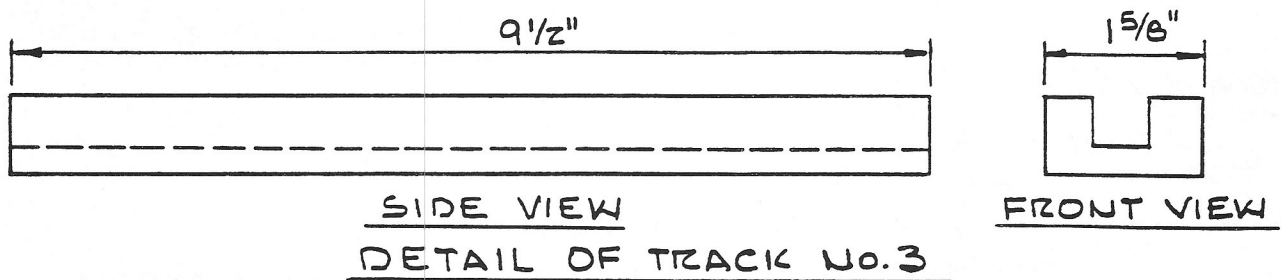
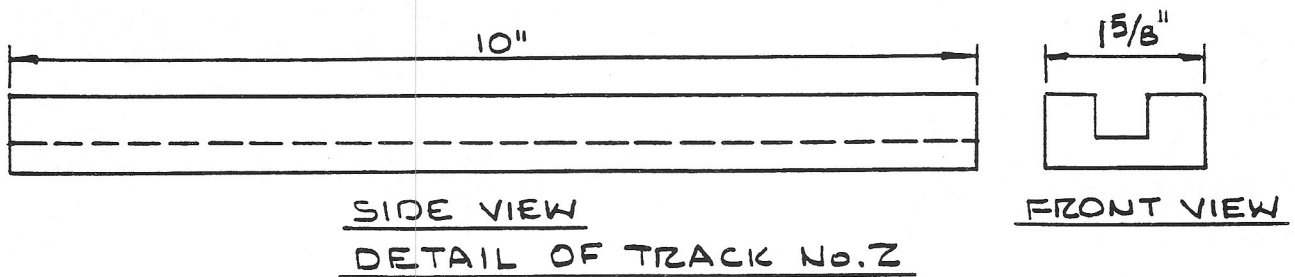
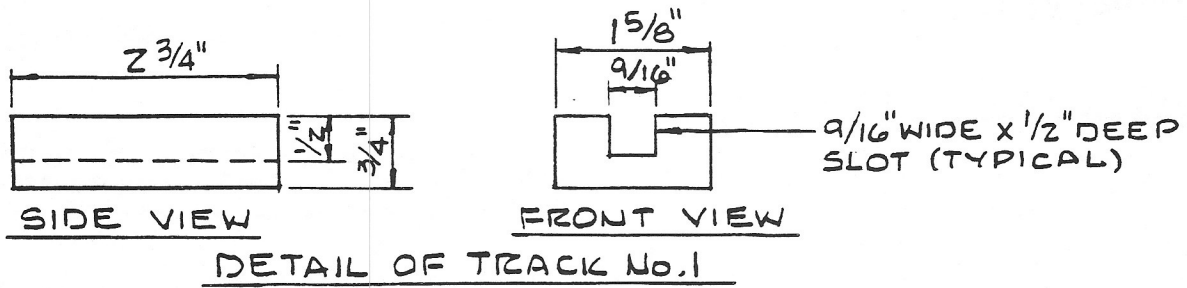
Fasten the ramp assembly to the upright ramp support as shown in the top view and the side view drawings. Spray the whole assembly with two coats of Varathane.

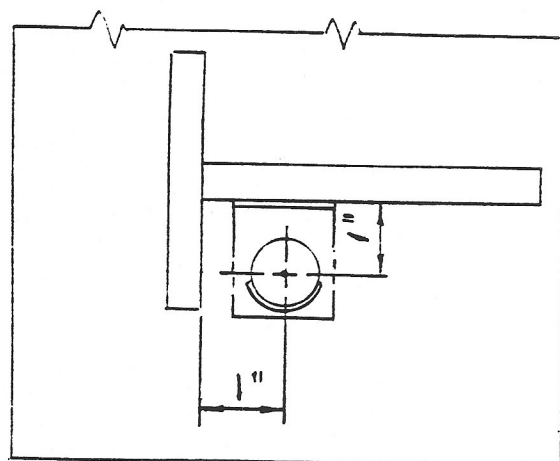
Secure the Velcro to make the ring storage out of the dowel installation as shown in the Details of Rings and Ring Storage. Using contact cement, put non-skid material on the bottom and trim the edges.



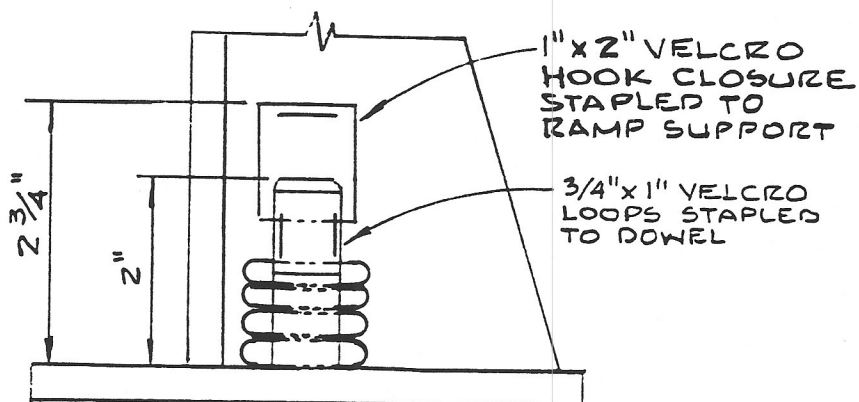
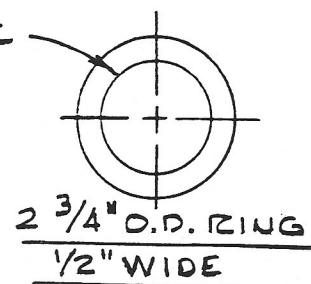
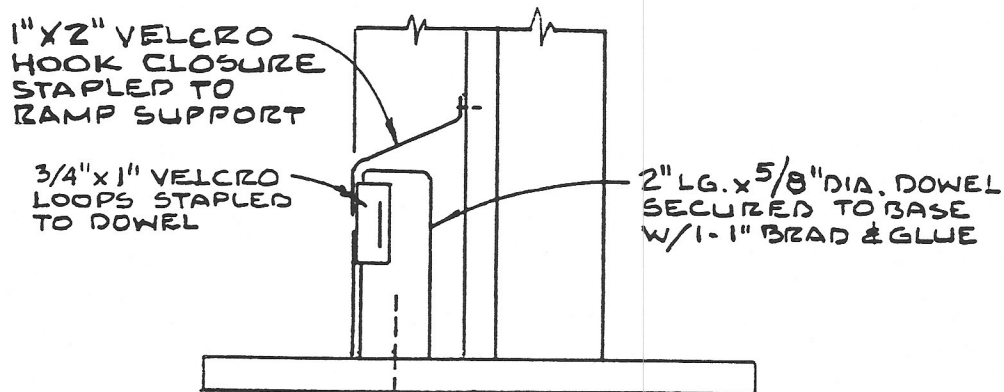
SIDE VIEW

NOTE:  
RAMP IS SHOWN IN  
FOLDED POSITION.



TOP VIEW

3/4" I.D. HOLE

SIDE VIEWFRONT VIEWDETAILS OF RINGS AND RING STORAGE





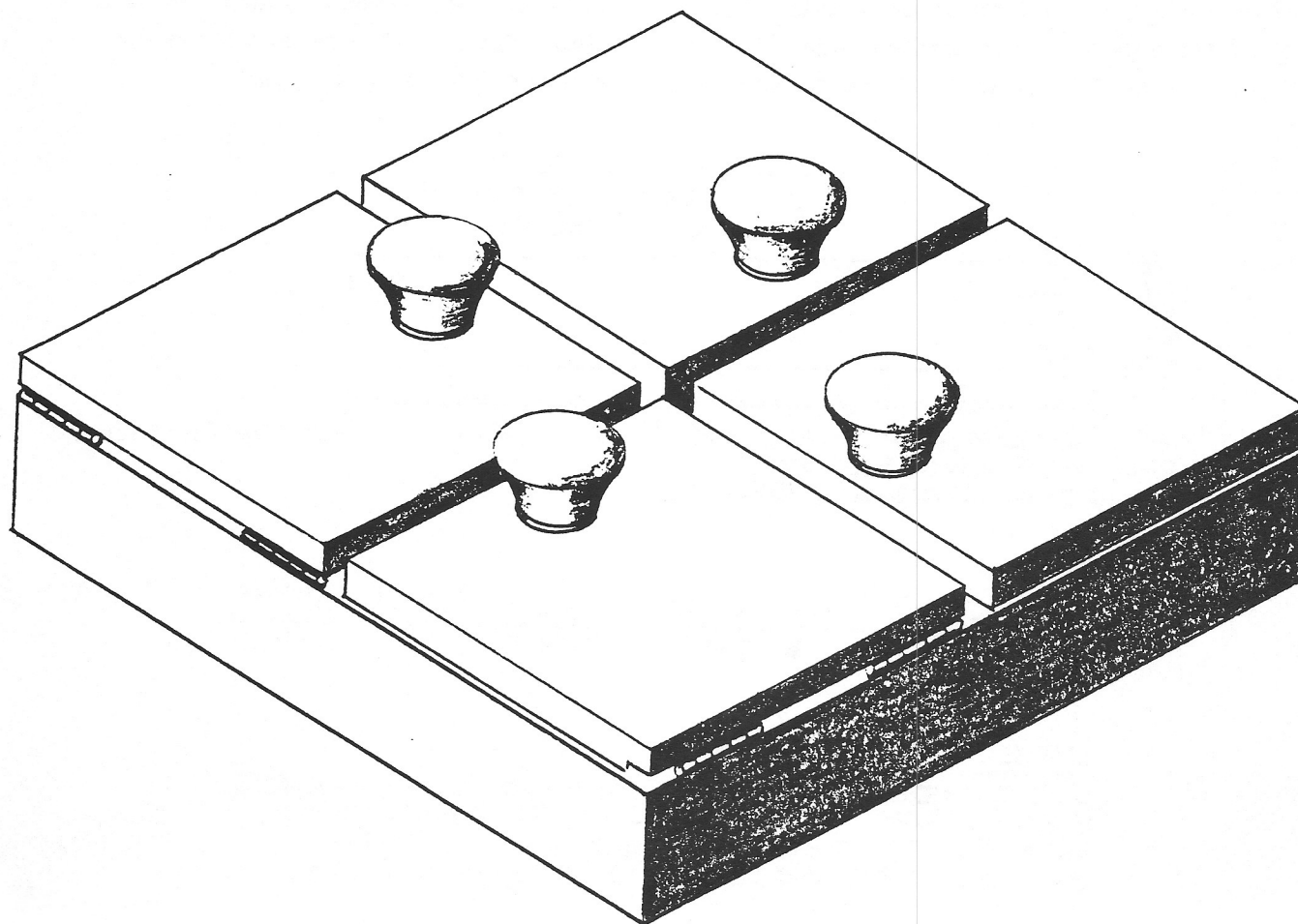
This creative toy caters to a child's natural curiosity and provides an opportunity to explore. It is also an ideal toy for the child who is developing the concept of object permanence. The doors on this box are easily opened. Behind each door is an object which has tactile, visual or auditory appeal. The light-activated musical movement provides the child with a simple cause and effect example. The musical element has a life expectancy of over a year and is replaceable at low cost.

With an older child, try this game: turn the box around and around to challenge the child. Then let him or her try to guess which door hides the music box in a kind of shell game with doors.

The baby door box is really simple to make. Care must be taken to get the dimensions right. If one color is used for the inside and a complementary color for the outside, a little masking prior to painting will be helpful.

**MATERIALS NEEDED**

- All of the wooden pieces can be cut from three pieces of 8" x 8" x 3/4" birch plywood
- Four 1 1/4" diameter wooden cupboard knobs and screws
- A piece of 1/4" plexiglas mirror 3 7/16" x 3 7/16" obtainable from any plastics company
- A 2" diameter pompom obtained from a crafts store



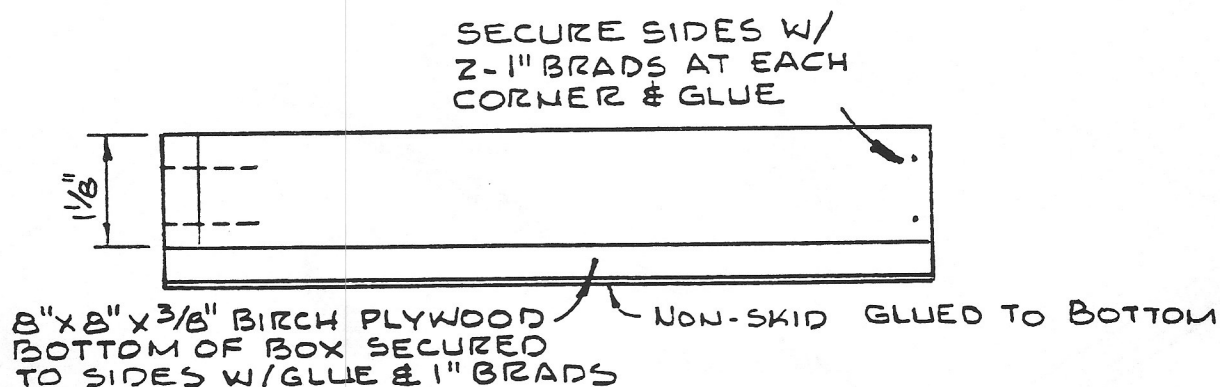
- A solid plastic animal that can fit into the box under one door, obtainable from a craft or toy store, usually many in one bag
- A "Touch-Me Melody Movement" for the bottom of one of the boxes under a door. These are obtainable for a small amount from KLOCKIT (See Some Sources of Specialty Items at bottom of Table of Contents).
- Masking tape
- Two colors of Varathane, or equal, spray paint
- Four pairs of hinges 1" long x 3/8" with screws
- 1" brads
- Elmer's Carpenter's Glue
- Non-skid material 8" x 8" for bottom
- Contact cement to adhere the non-skid material

### TOOLS NEEDED

- Table saw
- Power drill and a set of drill bits
- Ruler, screwdriver, etc.

### CONSTRUCTION SUGGESTIONS

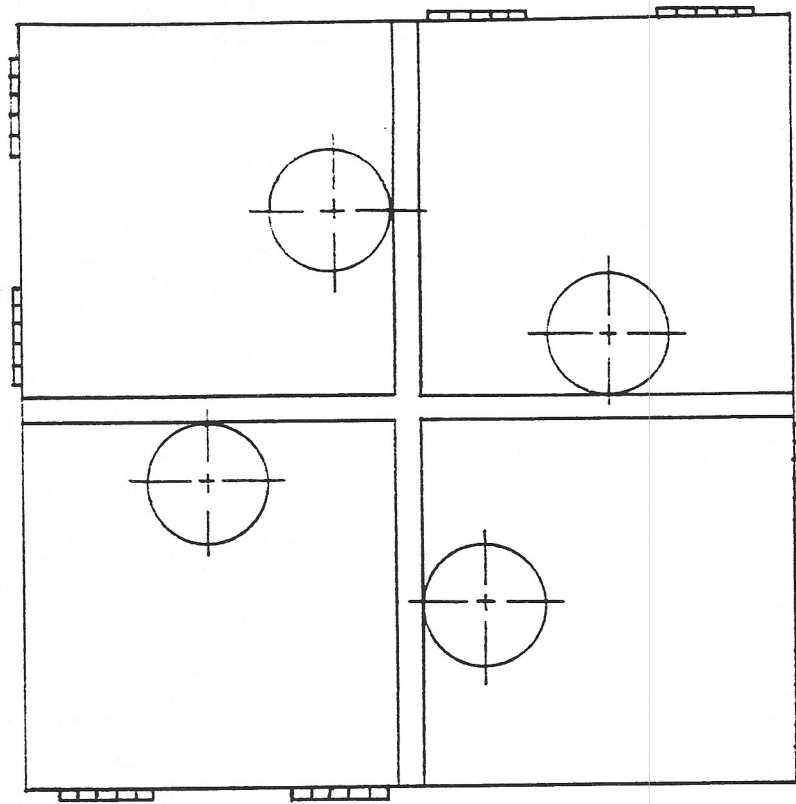
Cut out all of the pieces and sand them. Make the cut outs for the hinges on each door. Drill the holes in the doors for the knobs. Assemble all pieces except the doors and the knobs. Mask the insides and spray the outsides. Spray the doors the same as the outside of the box. Mask the outside and spray the insides of the boxes. Spray the knobs the same color as the insides. Install the various objects into the boxes. Install the doors and the knobs.



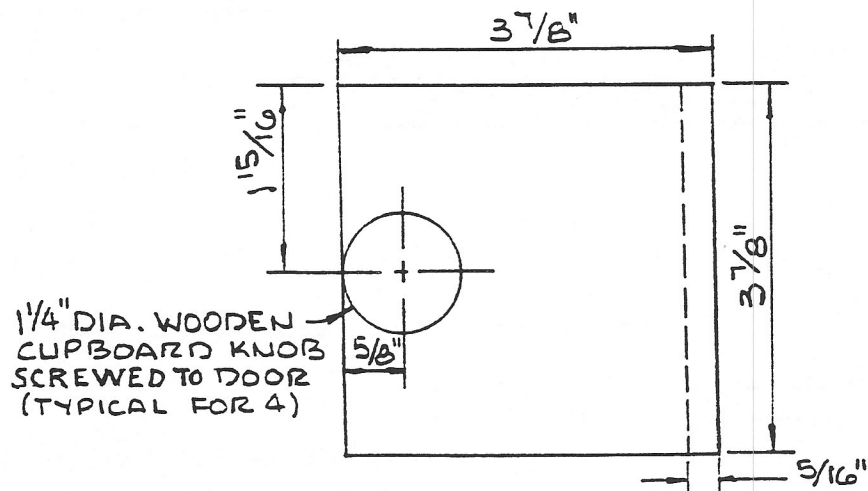
FRONT VIEW OF BABY DOOR BOX  
SHOWN WITHOUT DOORS

#### NOTE:

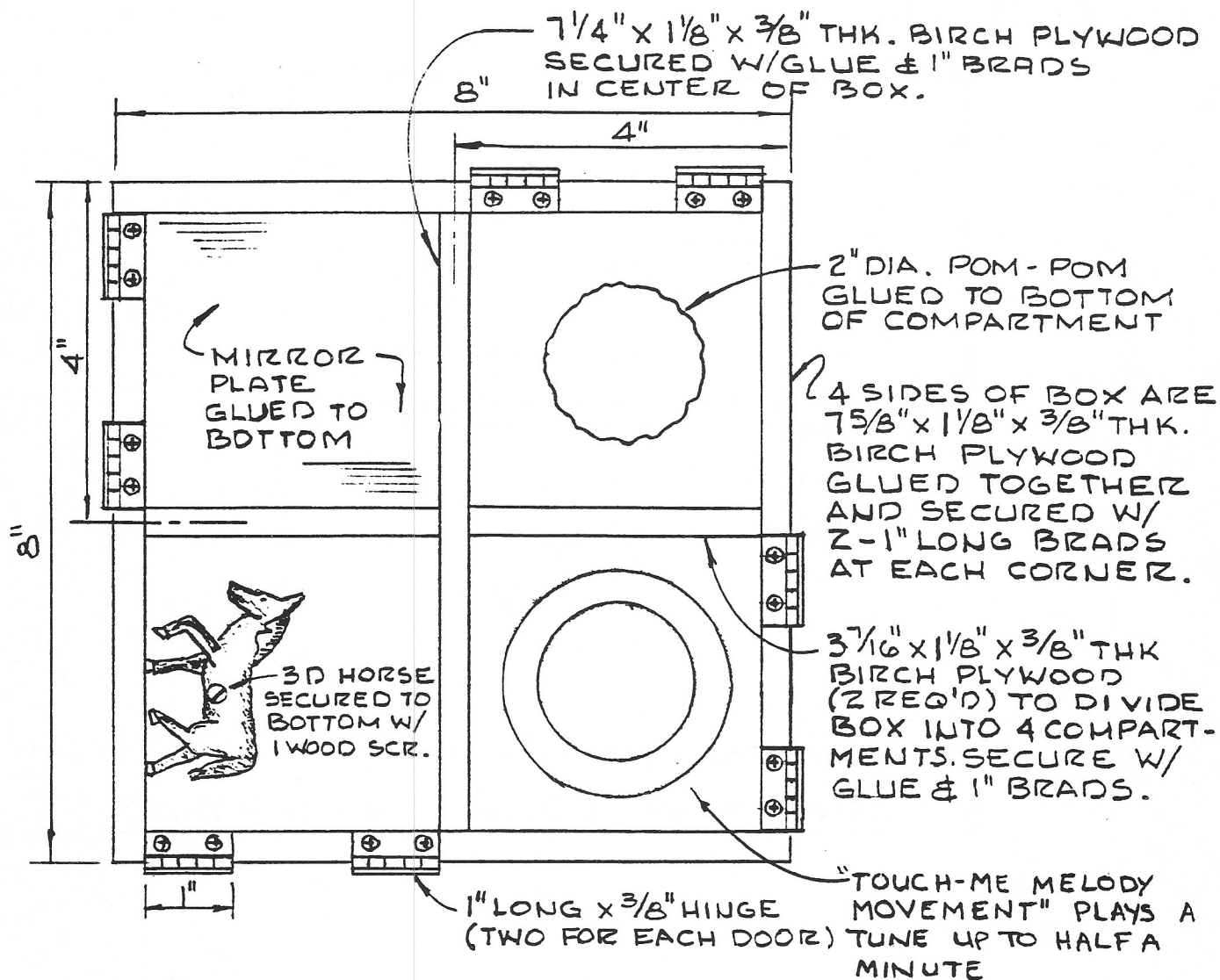
ALL DIMENSIONS ARE BASED ON PLYWOOD BEING 3/8". IF ACTUAL THICKNESS IS DIFFERENT, THE DIMENSIONS SHOWN SHOULD BE ADJUSTED ACCORDINGLY.



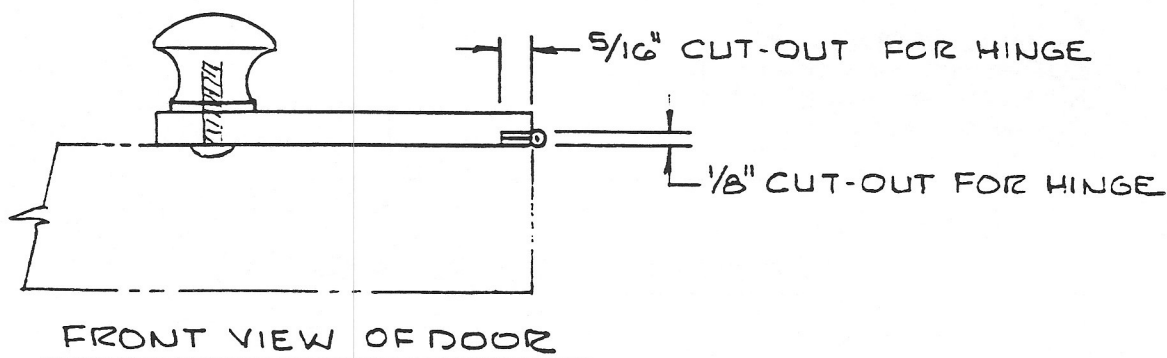
TOP VIEW OF BABY DOOR BOX (SHOWN W/DOORS)



TOP VIEW OF DOOR (4 REQ'D)



TOP VIEW OF BABY DOOR BOX  
SHOWN WITHOUT DOORS



The Peek-A-Port is another toy that looks complicated and difficult to make but really is not. The drawings are easy to read and all dimensions are shown. Details are given wherever a possible question could arise.

### MATERIALS NEEDED

- A piece of 3/8" birch plywood 3' x 3' will be plenty for all the pieces needed that are 3/8" thick.
- A piece of 1/8" plywood 4" x 4" for the slides. The same paneling used to make a recreation room in the basement will do nicely for the slides.
- Three wooden drawer knobs, 1" diameter, for the slides
- A 4 1/2" x 4 1/2" x 1/8" piece of Lexan or other polycarbonate mirror
- Enough 20 mil clear plastic sheet (rather heavy but still flexible) to make 11 pieces of 4 1/2" x 4 1/2"

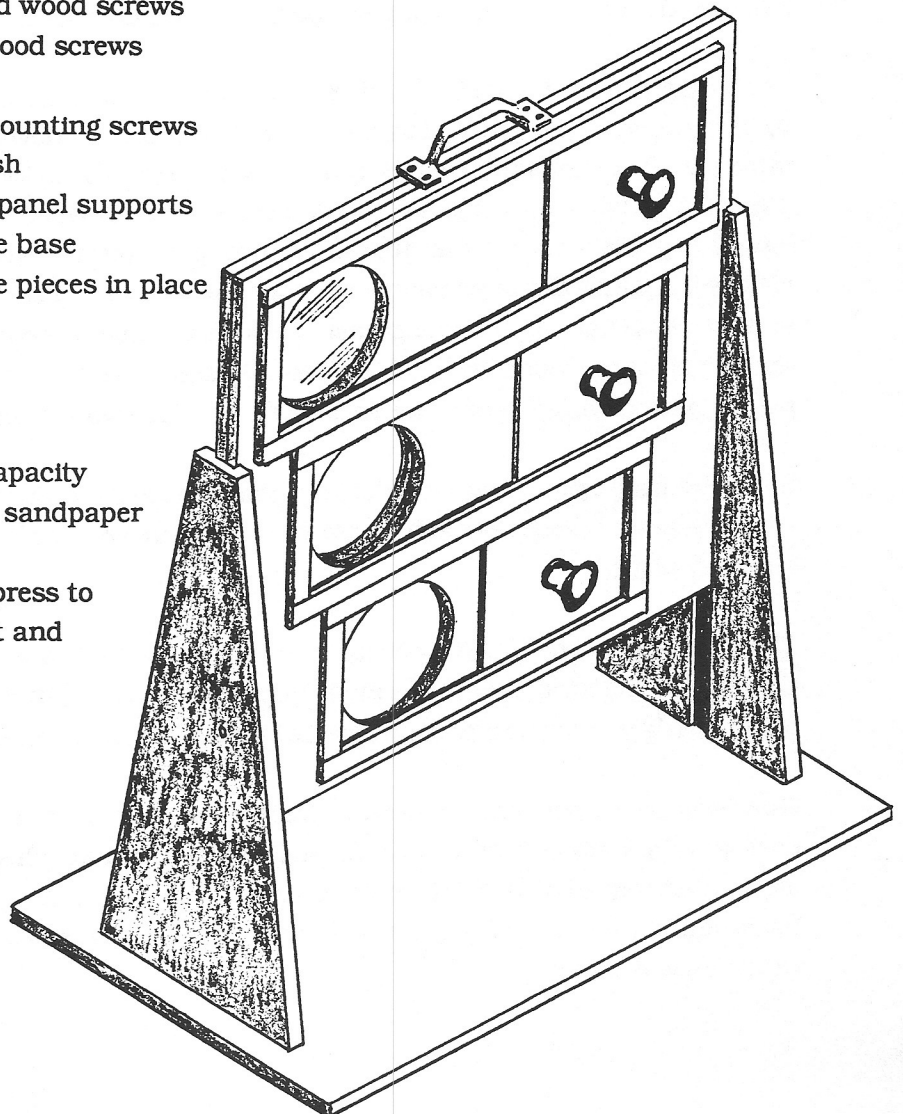
- Three colors of thin (3 or 4 mil) plastic sheet

The 20 mil and the 3/4 mil plastic sheet can be bought in a craft supply store or a store that sells model airplane materials.

- 12 - 1 1/4" x #6 Phillips flat head wood screws
- 6 - 3/4" x #4 Phillips flat head wood screws
- Elmer's Carpenters Glue
- One window sash handle with mounting screws
- Varathane, or equal, gloss varnish
- Varathane, or equal, enamel for panel supports
- Non-skid material or pads for the base
- 30 - 1/2" brads to tack the frame pieces in place

### TOOLS NEEDED

- A table saw
- A drill press and a set of drills
- A portable electric drill of 1/4" capacity
- A sander, or sanding blocks and sandpaper
- Ruler, square, screwdriver, etc.
- A circle cutter, used in the drill press to cut out the 3 3/4" holes in the front and back panels
- A 3/4" wood chisel





**CONSTRUCTION SUGGESTIONS**

Follow the drawing Detail No. 1 and cut out the front and rear panels. Also, make the layout of the 3 3/4" diameter holes

Using the circle cutter in the drill press, cut half way through the 3/8" plywood. The pilot drill in the center will be drilled all the way through when the cutter is only half way. Then turn the panel over, center the pilot drill in the hole and cut the hole the other half way. Complete all the holes in both panels in this manner.

On the top side of the bottom panel, carefully mark out where the 1/8" thick mirror piece is to go. See Detail No. 2, section "A-A." Make a saw cut, using the table saw, only 1/8" deep on the marks. Saw in from the sides of the panel just far enough or the cuts from the side and from the top to join. Then clamp the panel to the bench and use a chisel to remove the 1/8" thickness of plywood to make the indentation for the mirror piece.

Next, cut out the 16 7/8" x 10" base piece and the two panel support pieces. Cut the 3/4" wide slots up the center of the panel supports before making the diagonal cuts.

The frame pieces that hold the sliding panels are made by first cutting 1/2" wide pieces of 3/8" plywood of the proper lengths. Then make a hold-down jig that will be clamped on the table saw fence to permit a 1/8" x 3/16" wood removal to be made the length of the frame pieces. The hold-down jig is made of a scrap piece of wood and is 3/4" x 1" x 6." Down the 6" length is made a cutout that just fits the roughed out frame pieces, 1/2" x 3/8." This is then clamped against the table saw fence after the saw has been set to make a 1/8" deep cut. By setting the fence up almost against the saw, a frame piece is pushed through the cutout and about half of the wood removal is done. By setting the fence back a bit and pushing the same frame piece through again, the entire 1/8" x 3/16" wood removal has been done easily.

Sand the frame pieces on all sides, cut them to length and, using brads and glue, put them in place. The end pieces of each frame are to be screwed in place (to better varnish without the slides in place).

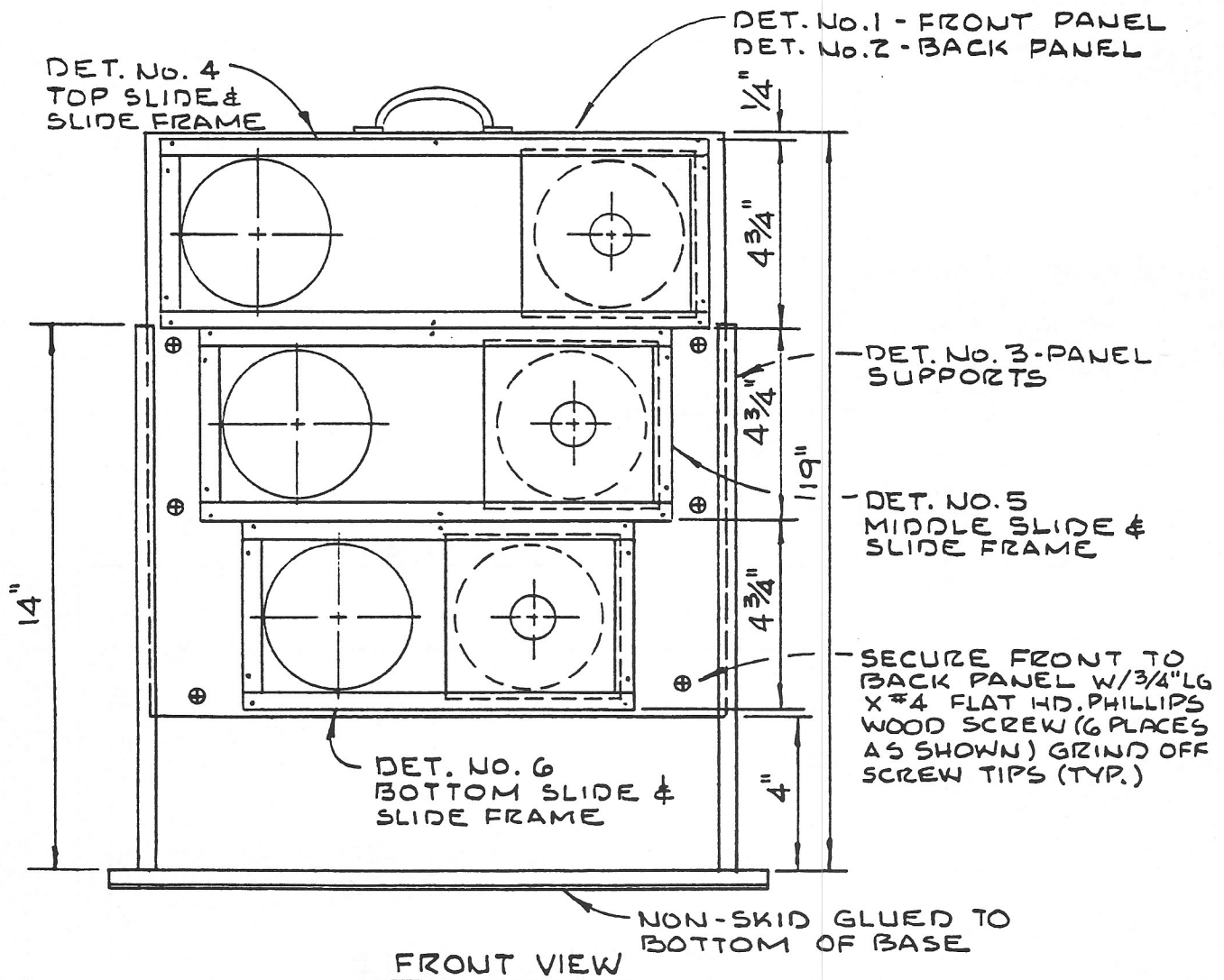
The slides are made of 1/8" plywood. If this is not readily available, some scrap pieces of wall paneling of the kind used for remodelling will do nicely. After cutting the slides to size, carefully sand all edges and then place where the knobs are to be glued to each.

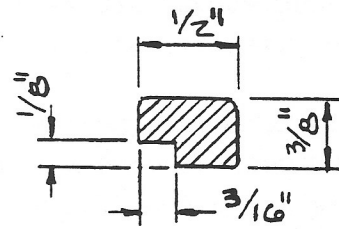
One back panel port has the mirror piece in place, two are left open, and the other three ports each have a sandwich of a clear plastic, a colored plastic sheet, and a clear plastic piece assembled and then stapled in place as shown in Detail No. 2. Then the front panel and the back panel are put together and held with screws, properly countersunk, as shown on the Front View drawing.

The assembly, without the slides, and the slides with knobs, and the base piece are to be given two coats of Varathane, or equal, gloss varnish with light sanding between coats. Assemble the slides and the screwed-in-place pieces of frame.

The panel supports are to be given two coats of Varathane, or equal, gloss enamel, with light sanding between coats. The supports are to be secured to the front and back panel assembly as shown on Right Side View. This assembly is then attached to the base piece as shown in the Top View.

A window sash handle is screwed onto the top as shown in Front View. A piece of non-skid material affixed to the underside of the base piece will finish the toy.

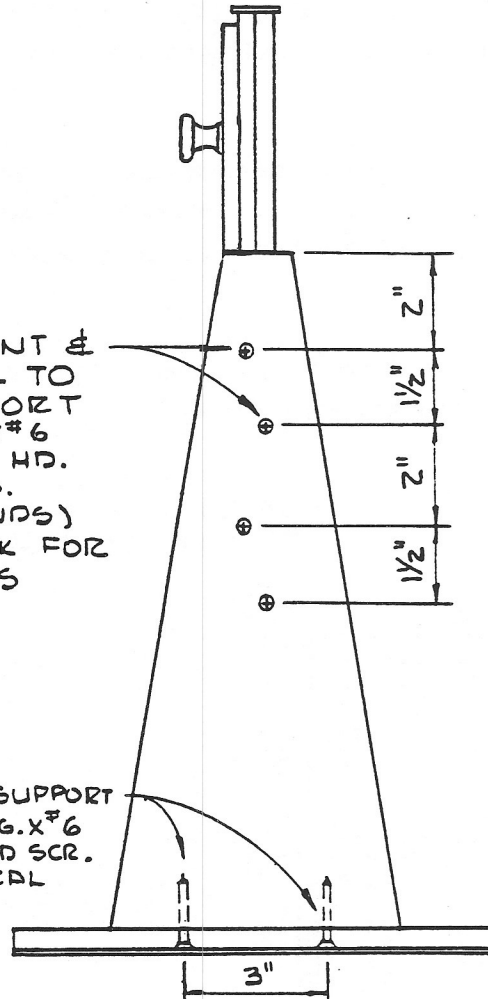




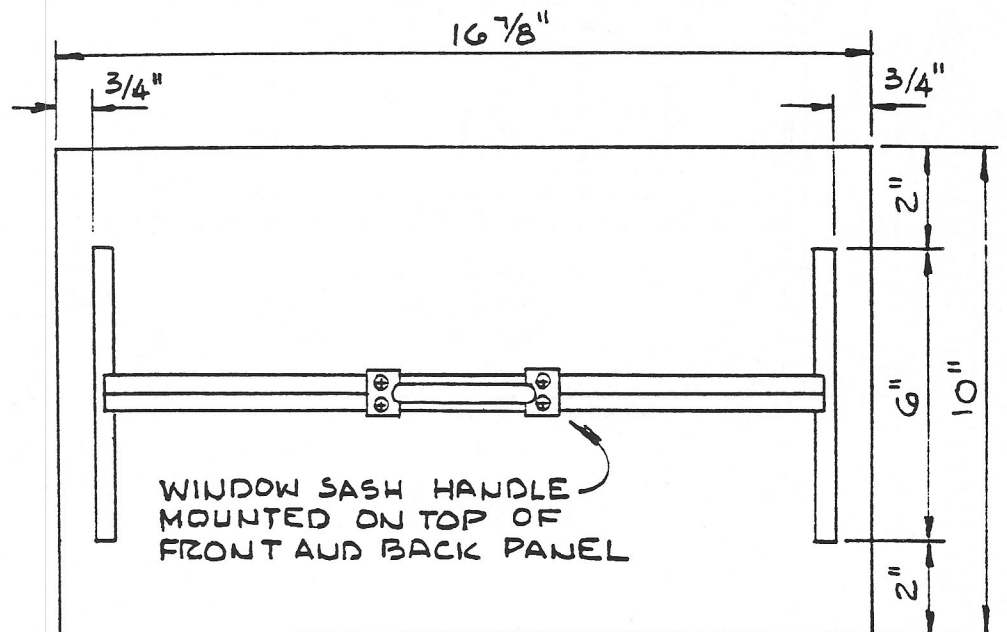
SECTION "A-A"  
TYPICAL CROSS SECTION  
OF FRAME

SECURE FRONT &  
BACK PANEL TO  
PANEL SUPPORT  
W/4-1 1/4" LG. X #6  
PHILLIPS FLAT HD.  
WOOD SCREWS.  
(TYP. BOTH ENDS)  
COUNTER SINK FOR  
SCREW HEADS

SECURE PANEL SUPPORT  
TO BASE W/1 1/4" LG. X #6  
PHIL. FLAT HD. WOOD SCR.  
AND GLUE (TYPICAL  
BOTH SIDES)



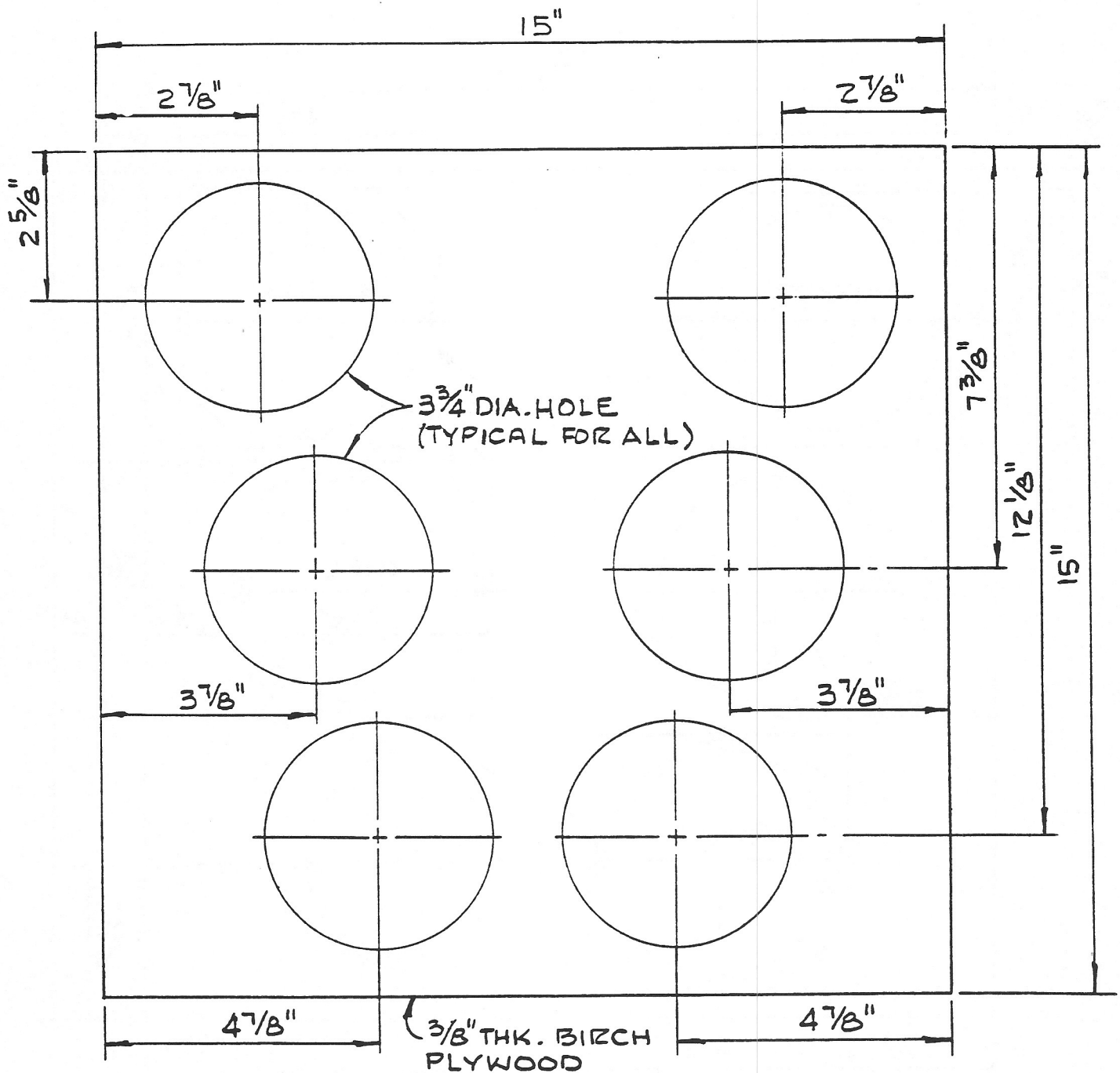
RIGHT SIDE VIEW



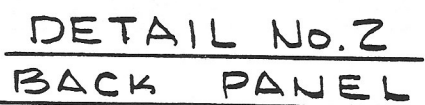
WINDOW SASH HANDLE  
MOUNTED ON TOP OF  
FRONT AND BACK PANEL

3/8" THK. BIRCH PLYWOOD  
BASE

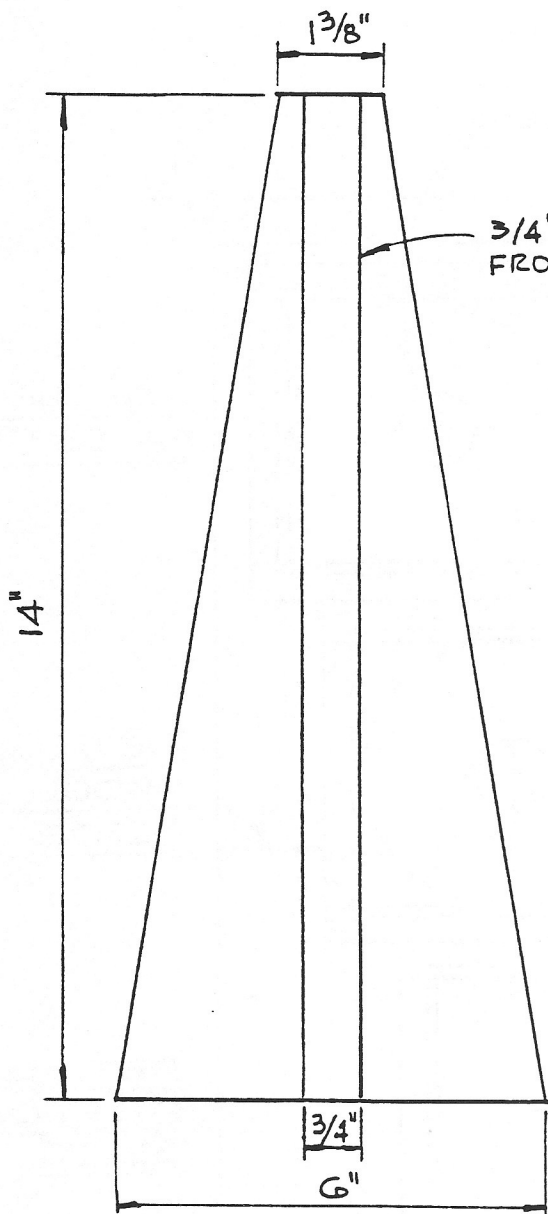
TOP VIEW



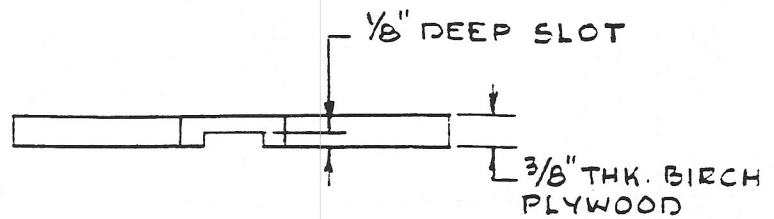
DETAIL No. 1  
FRONT PANEL (SHOWN W/CUTOUTS)



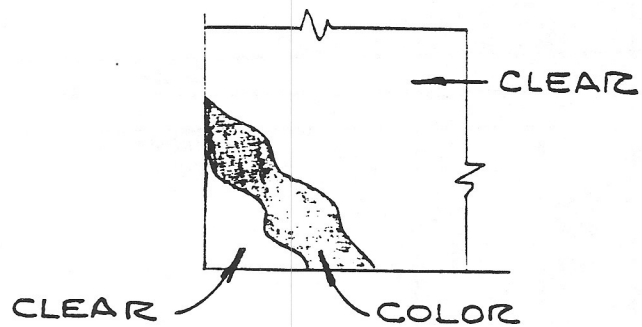
SHOWING MIRROR AND PLASTIC SHEETS STAPLED TO PANEL



DETAIL NO. 3  
PANEL SUPPORT  
(2 REQ'D)

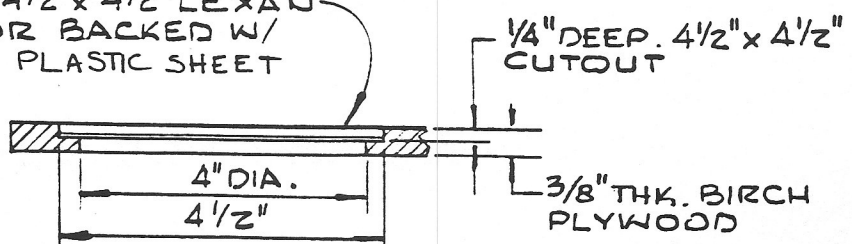


TOP VIEW OF  
PANEL SUPPORT



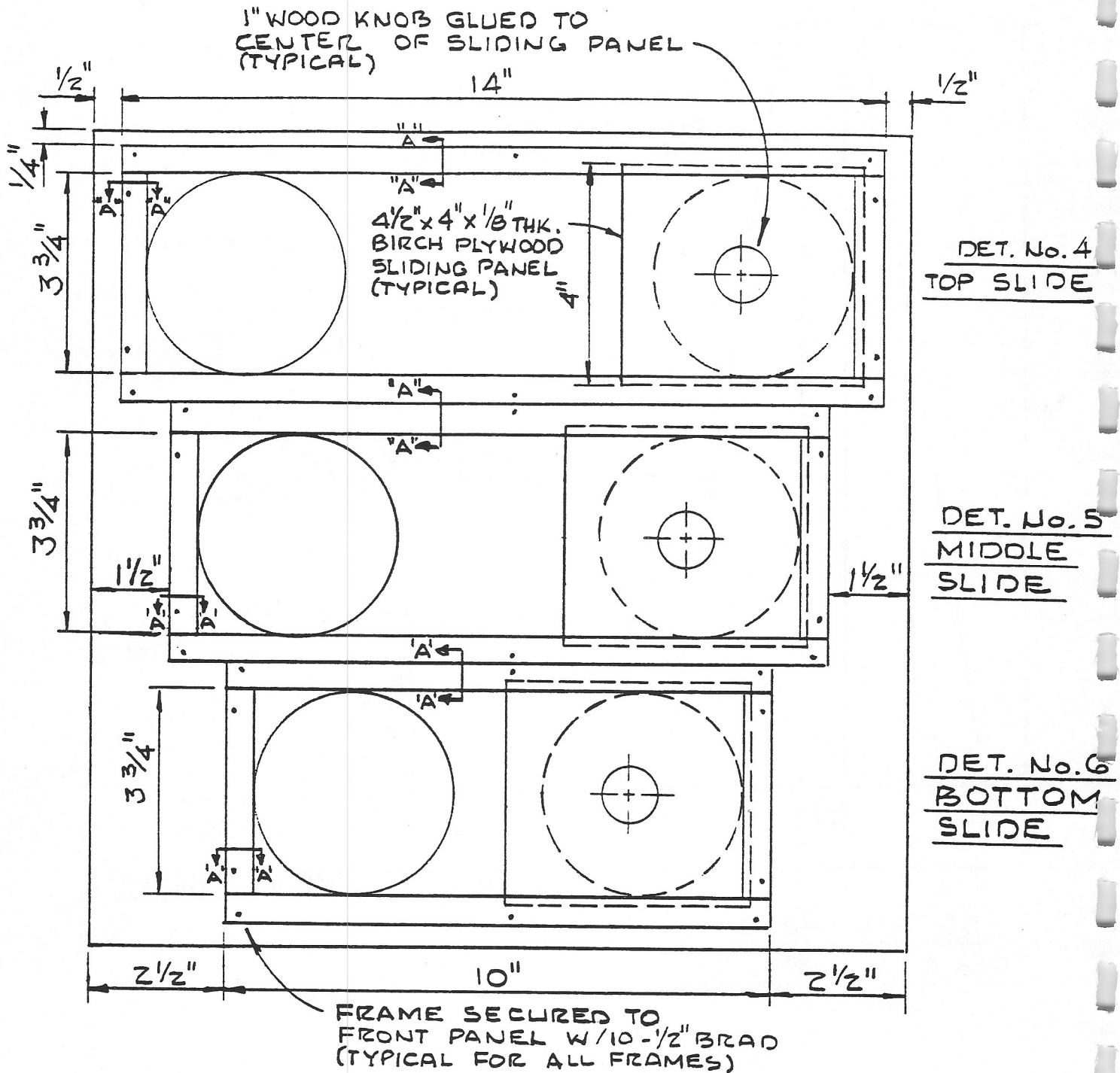
PLASTIC SHEET DETAIL

$\frac{1}{8}"$  THK.  $4\frac{1}{2}" \times 4\frac{1}{2}"$  LEXAN  
MIRROR BACKED W/  
CLEAR PLASTIC SHEET



SECTION "A-A"



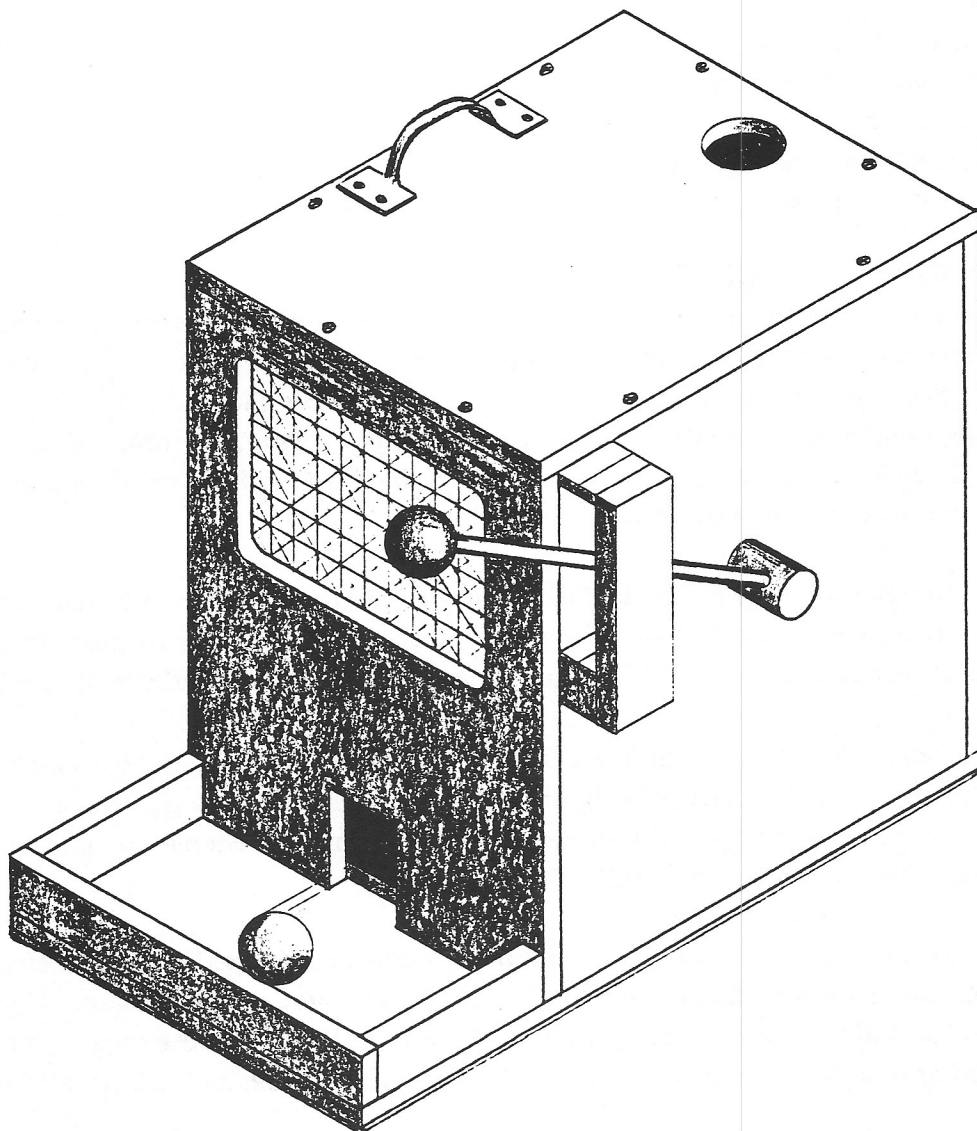


DETAILS No. 4, 5 & 6

It's so simple. Put the ball in, pull the handle and hear the bells jingle as the ball falls down and out into the receiving tray. Simple but fascinating. The Bandit Toy has a stable base for safe one-handed operation and a handle makes it easy to transport. The drawings are quite specific and well detailed but this is still a toy for the more experienced and skilled woodworker.

**MATERIALS NEEDED**

- All of the plywood pieces can be cut from one 3 1/3' x 2' piece of 3/8" birch plywood.
- One dowel, 3/4" diameter x 8 1/8" long
- One dowel, 7/16" diameter x 6 3/8" long
- Two pieces of 1/4" birch plywood, 1 1/4" x 1 1/4" ( or 1/4" Masonite) with 13/16" hole in center to be used as spacers on each side of the tray assembly
- One 12" x 6" piece of perforated aluminum sheetmetal of approximately 24-26 gauge (1/4" x 1/4" hardware cloth or metal screening could be substituted)



- One window sash handle
- Non-skid material for outside bottom, 7 1/8" x 11 1/8"
- Contact cement
- Elmer's Carpenter's Glue
- Varathane, or equal, enamel and spray paint
- One 3/4" x #6 tapping screw
- Two 3/4" x #4 slotted round head screws
- 3/4" x #17 brads
- Twelve 1" x #6 - 1" long flat head Phillips tapping screws
- Two 1 1/4" diameter wooden balls. One drilled to fit on a 7/16" dowel as a handle. Both to be painted. Balls can be ordered from Cherry Tree Toys. (See Some Sources of Specialty Items on bottom of Table of Contents page.)
- Large (1 1/4" or 1" diameter) Jingle Bells obtained from craft store

### **TOOLS NEEDED**

- Table saw
- Sander and sanding block
- Drill press and set of drill bits
- Tin snips and heavy scissors
- Screwdriver, hammer, square, etc.
- Staple gun with staples

### **CONSTRUCTION SUGGESTIONS**

Cut out all six pieces that make up the outside box and drill or saw the holes as located on the drawings. Then cut out the pieces that make up the chute and assemble these as shown in the "Top View of Chute" and "Side View of Chute." Cut out the pieces that make up the tray and chamfer the plywood pieces in places shown on the "Top View of Tray Assembly." Cut out the 1 1/2" x 1 7/8" hole in the bottom panel as shown on the "Top View of Tray Assembly." Now assemble the plywood pieces of the tray.

Cut the 3/4" diameter dowel to 8 1/8" length and flatten the dowel surface where it will be screwed to the tray as shown in "Front View of Tray Assembly." Drill a 7/16" hole in the dowel at a 30° angle to the flat surface of the tray as shown in "Relation of Handle to Tray Mounting."

Cut the perforated aluminum plate to fit on the top of the tray assembly and with a 2" x 2" cutout as detailed on the "Top View of Tray Assembly." Grind off the hanger loop from each bell and put one of the large jingle bells in each of the outer tracks. Staple the aluminum plate in place. Then screw the flattened dowel to the bottom.

Assemble the outer box that has had the front cutout made and the perforated aluminum piece stapled to the inner side over the cutout. The front piece should be fastened using glue and brads, to the side that will not have the dowel handle with the ball, and the back should be similarly glued and nailed to the side. Then the bottom piece should be lined up with the back

and the side and glued and nailed. Finally, the front should be held square and glued and nailed to the bottom.

The assembled chute is then located to allow the ball to drop into the chute of the top rear and discharge out the front cutout below. Glue and nail the fence pieces that will hold the ball when it emerges from the cutout in the front panel.

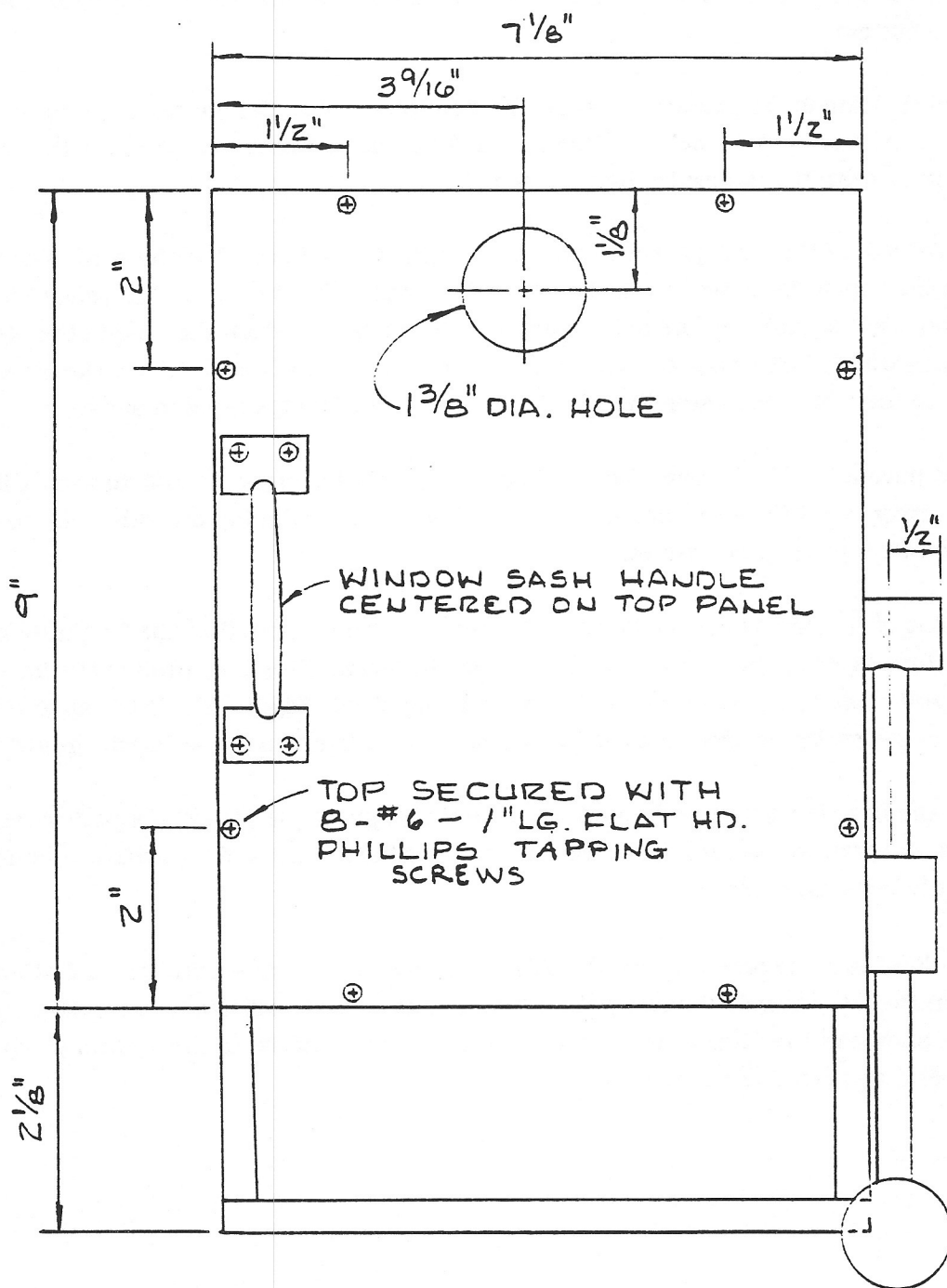
Put the 1 1/4" x 1 1/4" x 1/4" plywood spacers over the dowel screwed to the bottom of the tray so that the tray is held away from the sides of the box. Slip the shorter dowel end into the side of the box that is nailed to the bottom and the longer end through the hole in the other side of the box while sliding that side into place between front and back. Screw the front and back pieces to the side piece using the #6 - 1" long flat head Phillips tapping screws.

The top is to have a 1 1/2" diameter hole drilled through that is centered side to side of the box and whose center is 1 1/2" from the outside of the back. Screw the top on with eight #6 - 1" long flat head Phillips tapping screws.

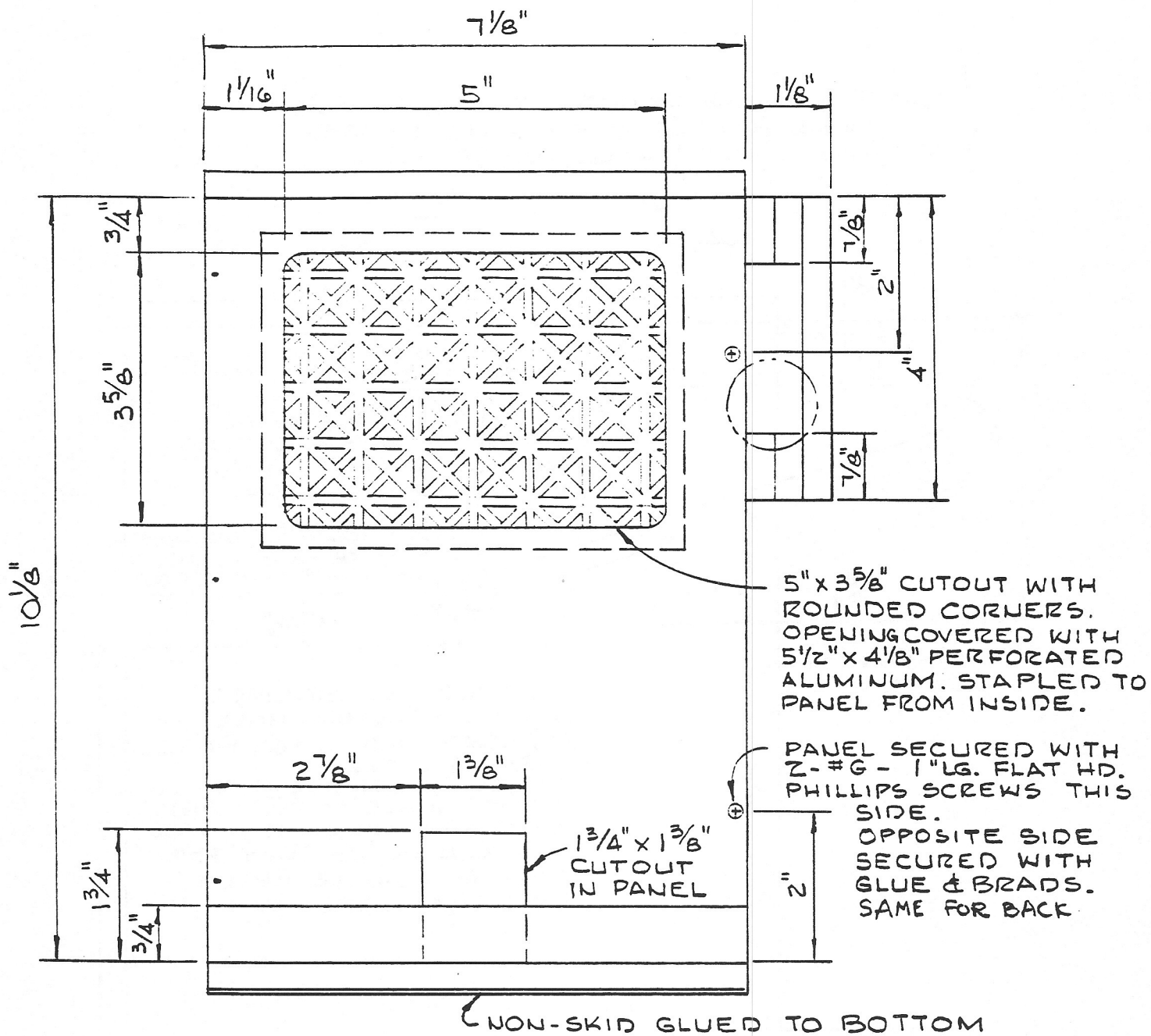
On the outside of the box where the handle with the ball is mounted, (See the "Right Side View") glue three layers of 3/8" thick birch plywood as shown. This is to protect the handle from being pulled off with a sideways pull. The drawing of the "Right Side View" as well as the perspective of the entire toy gives a clear picture of the construction of the handle guard.

Spray paint the handle with its ball glued on the end and put aside. Mask the perforated aluminum in the front panel and spray the entire box with two coats of Varathane enamel, sanding lightly between coats.

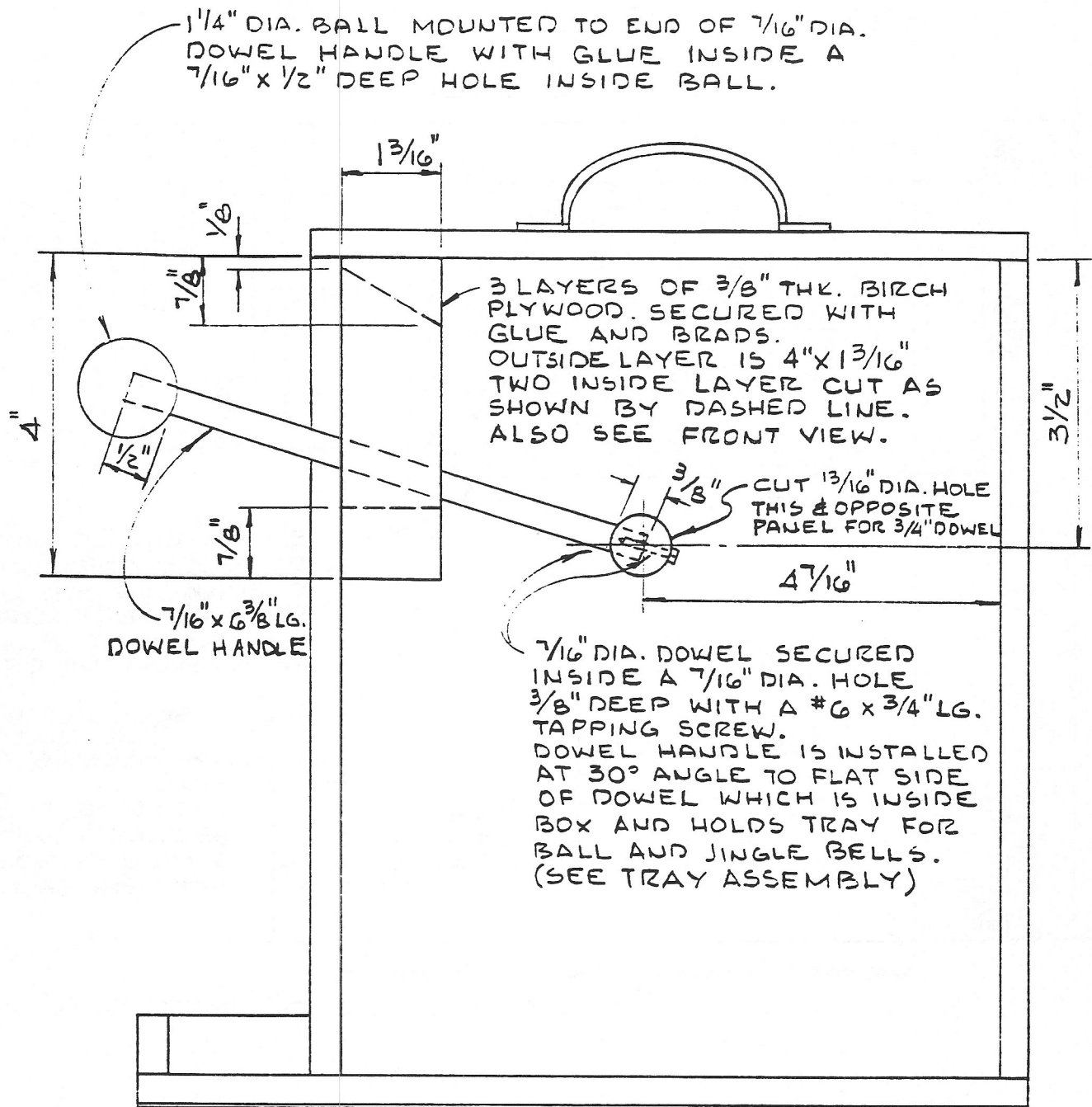
Using a #6 - 3/4" tapping screw, screw the 7/16" x 6 3/8" long handle with the ball attached to the hole in the 3/4" dowel. Screw on the window sash handle, centered on the side of the top panel as shown in the "Top View." Fasten the non-skid material to the bottom using contact cement, two coats to each surface.

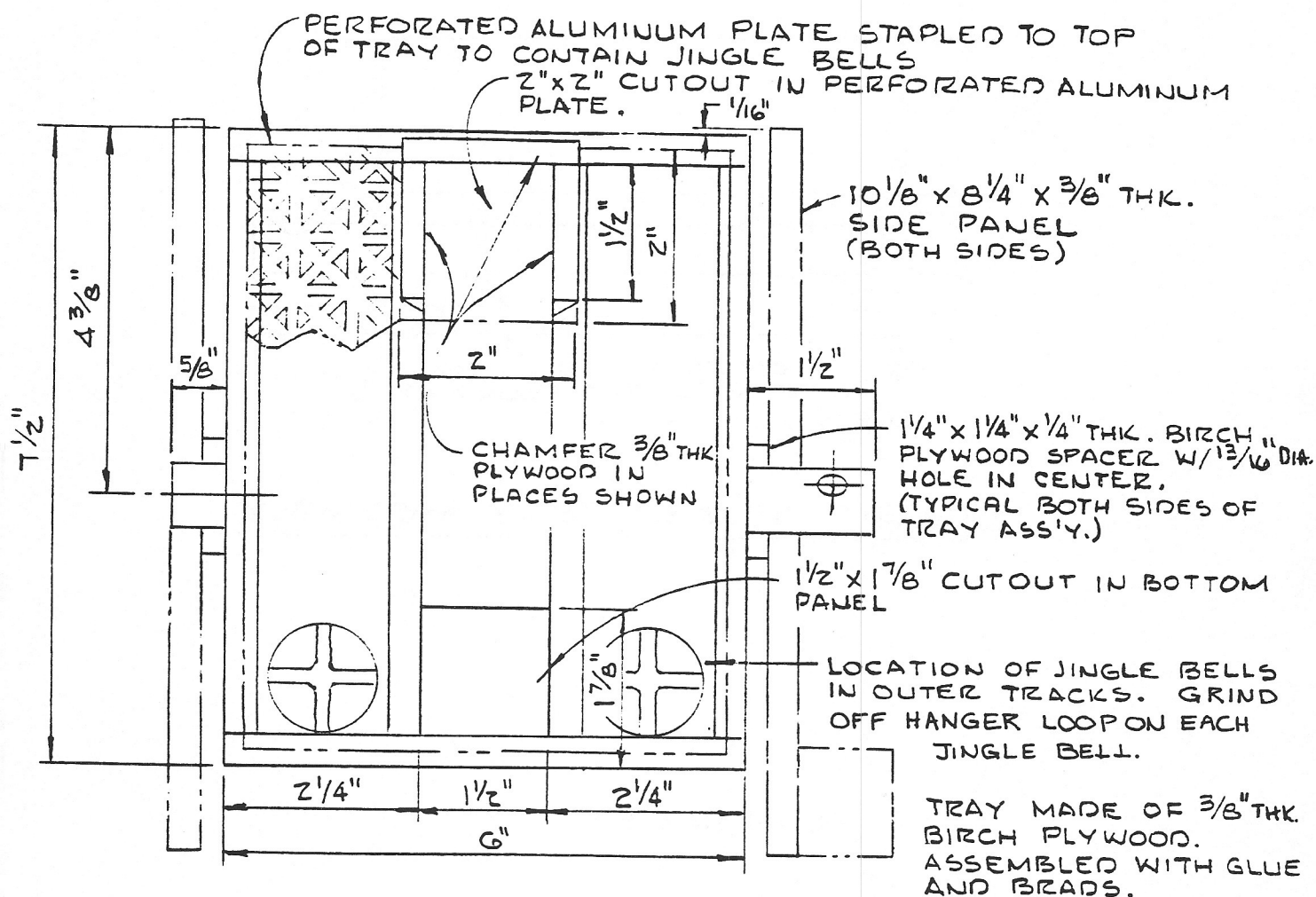


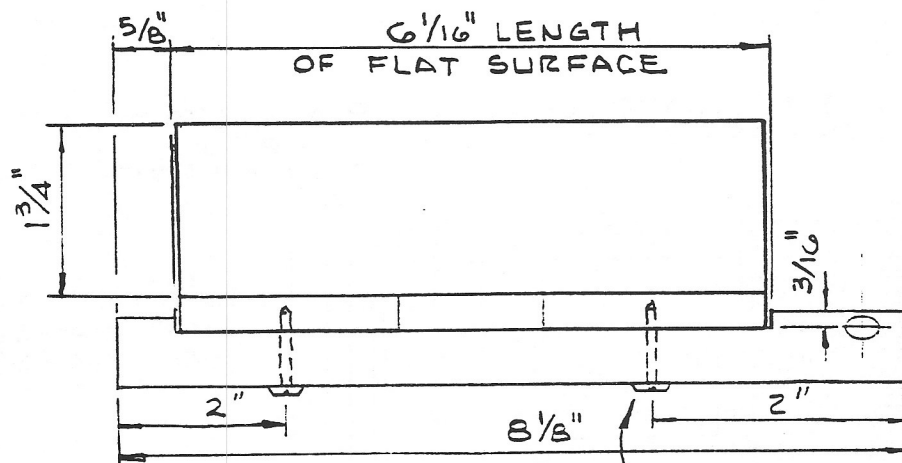
TOP VIEW

FRONT VIEW



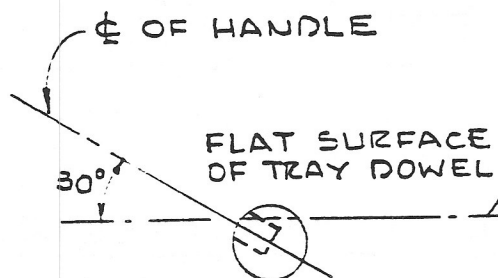
RIGHT SIDE VIEW

TOP VIEW OF TRAY ASSEMBLY

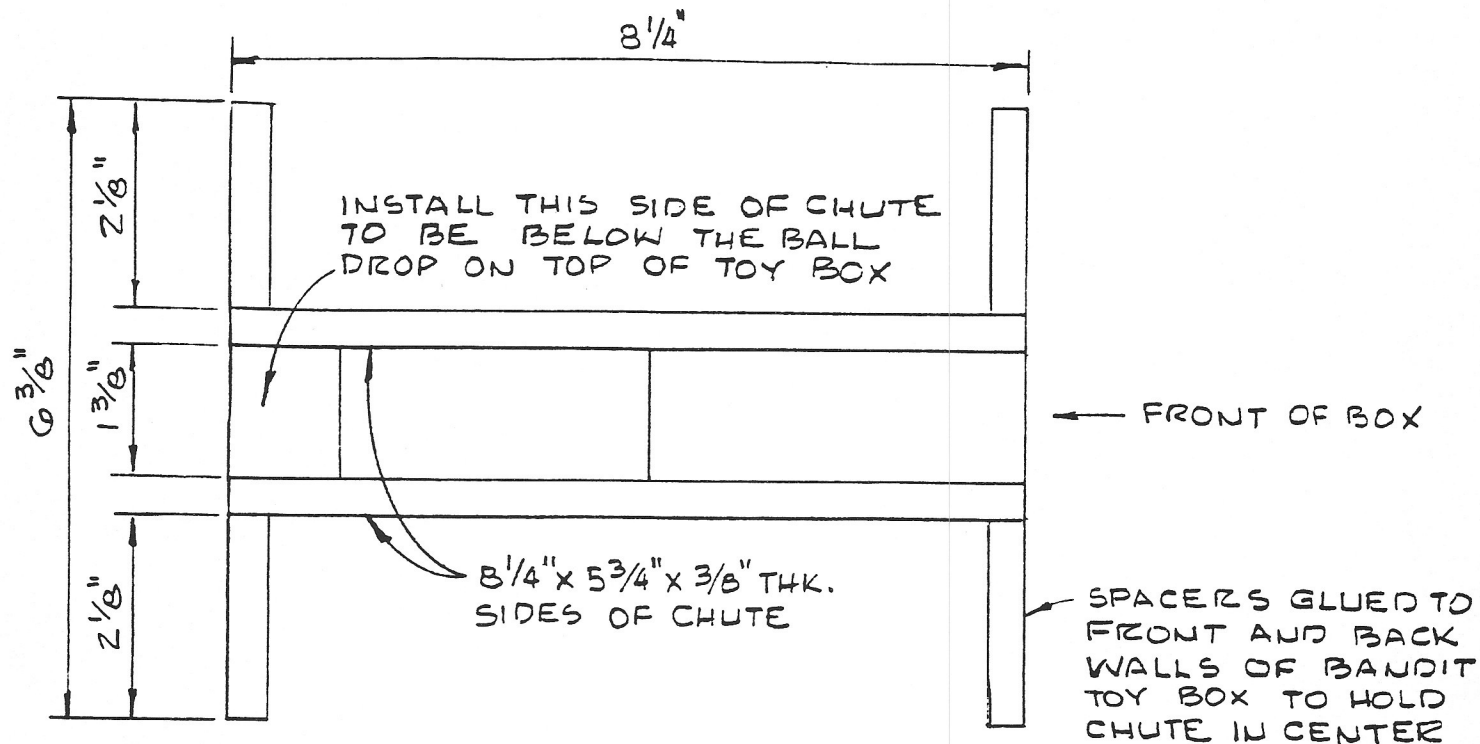


TRAY SECURED TO  $\frac{3}{4}$ " DIA. DOWEL WITH  
2-#6  $\frac{1}{4}$ " LG. SLOTTED ROUND HEAD  
SCREWS AS SHOWN

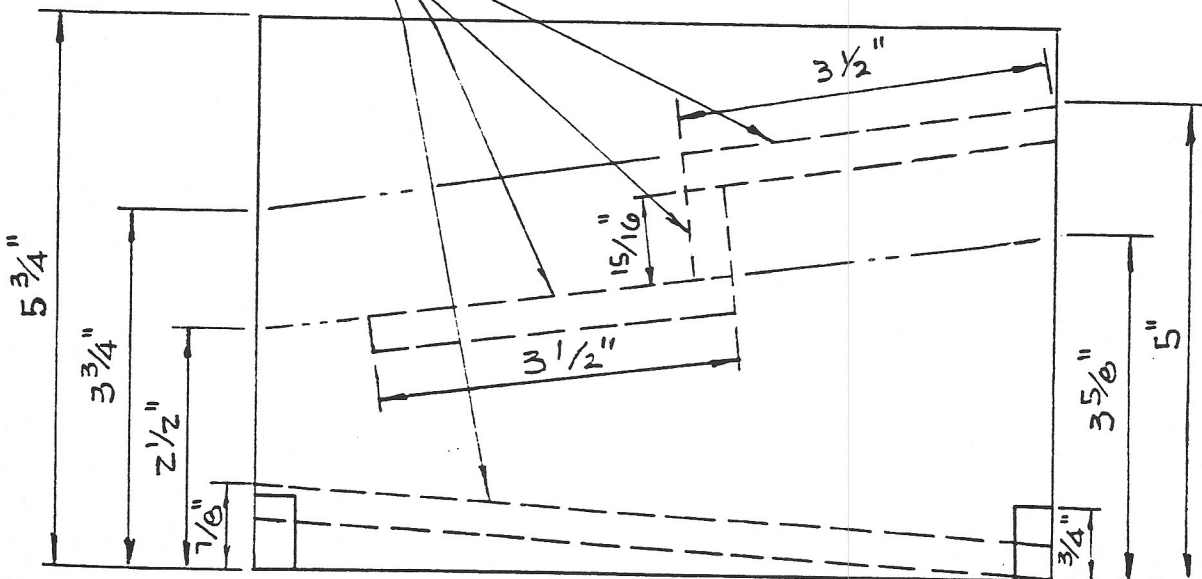
### FRONT VIEW OF TRAY ASSEMBLY



### RELATION OF HANDLE TO TRAY MOUNTING

TOP VIEW OF CHUTE

$1\frac{3}{8}"$  WIDE  $\times \frac{3}{8}"$  THK BIRCH PLYWOOD RAMPS. CUT TO LENGTHS AS SHOWN. SECURED WITH GLUE TO SIDES OF CHUTE.

SIDE VIEW OF CHUTE



These benches are simple to make and very versatile. A child straddling the end of the bench has a playing surface on the remaining portion of the bench. The bench can become a small table for a child sitting on the floor.

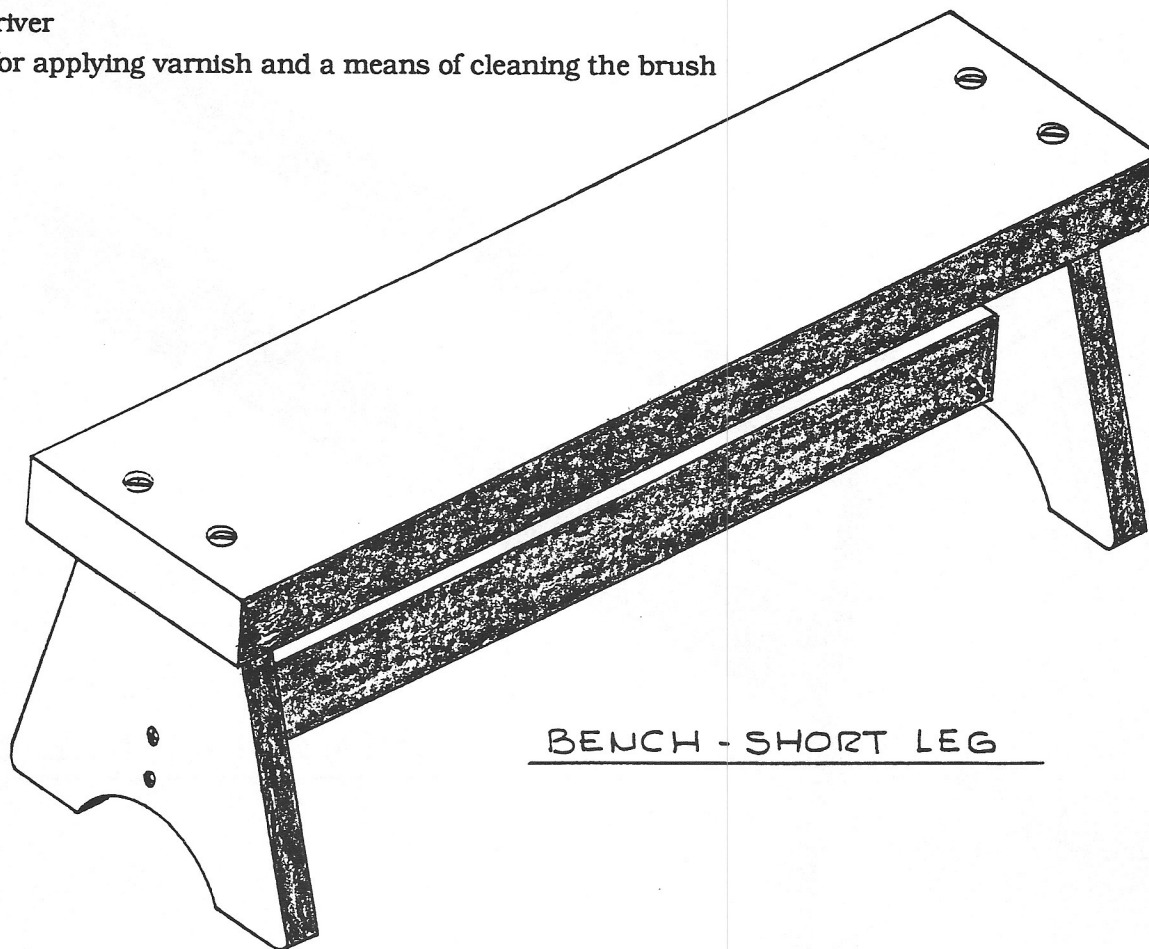
Separate drawings are provided here for the tall leg bench and the short leg bench.

**MATERIALS NEEDED**

- For either bench, the top is cut from a piece of construction grade 2" x 6." By buying a bit selectively, and by buying about three lineal feet for each two foot piece needed, a top can be made that is reasonably free of knots and other blemishes.
- 3/4" birch plywood for the legs and crossbar, following the detailed drawings.
- For each bench to be made, four 2" x #8 pan head screws
- For each bench to be made, four 1 3/8" x #6 Phillips head tapping screws
- Varathane gloss varnish, or equal

**TOOLS NEEDED**

- Table saw
- Band saw or saber saw
- Sander or sanding block and sandpaper
- Drill press or portable electric drill or brace
- Set of drill bits
- Screwdriver
- Brush for applying varnish and a means of cleaning the brush



BENCH - SHORT LEG



**CONSTRUCTION SUGGESTIONS**

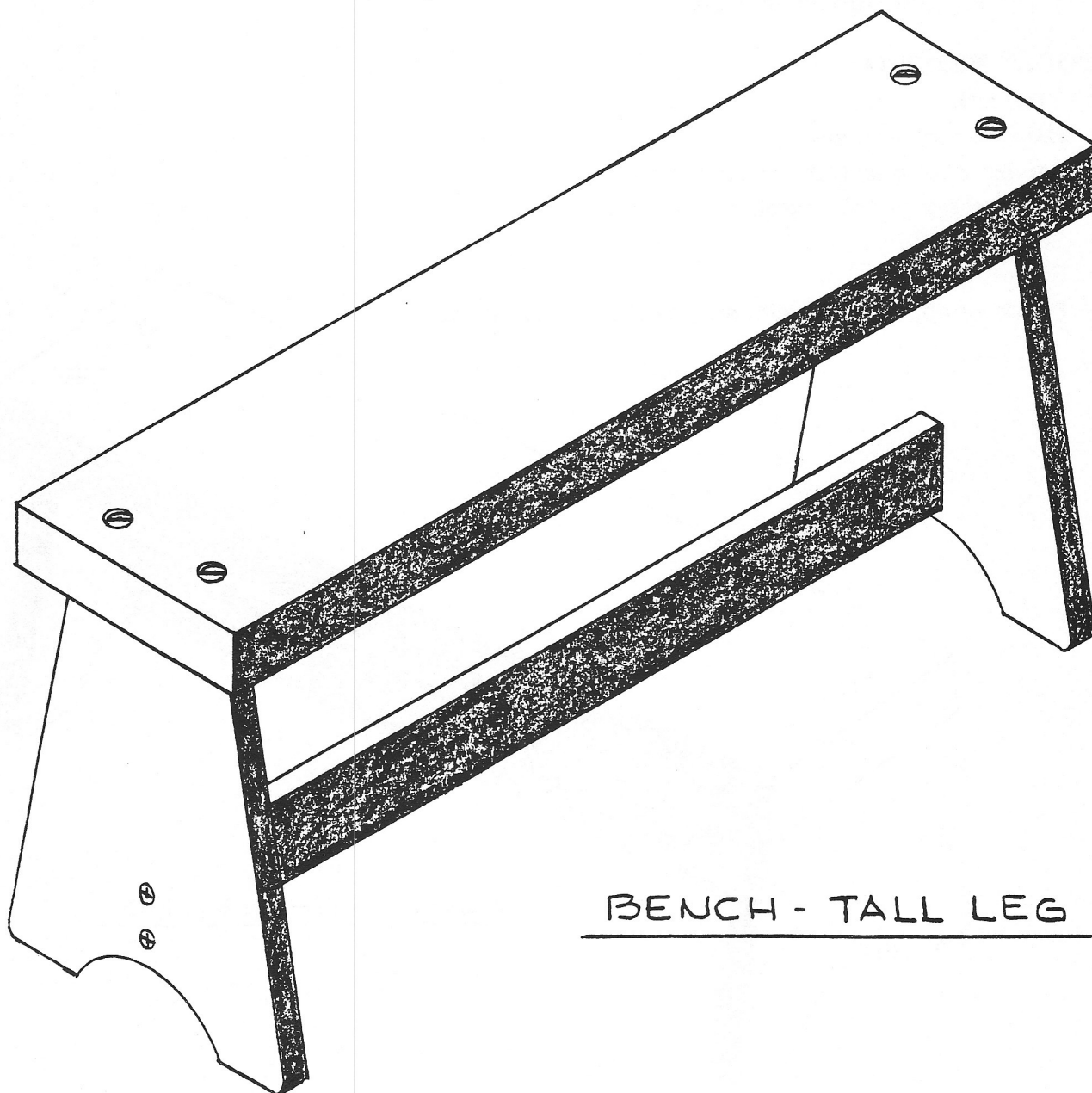
Select the best portion of the 2" x 6" and cut to length. Then cut to width. Sand flat on top and bottom and round off the corners carefully. Cut out the legs and crossbar and sand carefully.

Drill countersink holes on the top piece, then the screw hole. Drill the holes in the legs and the countersink for the screw heads.

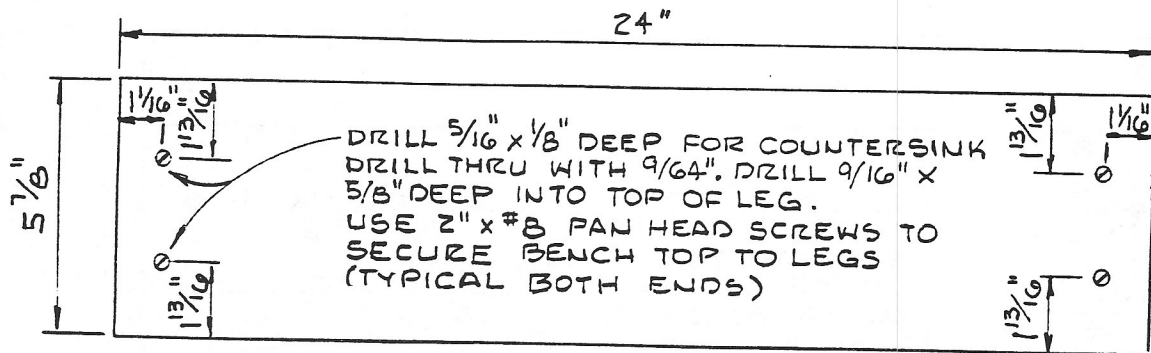
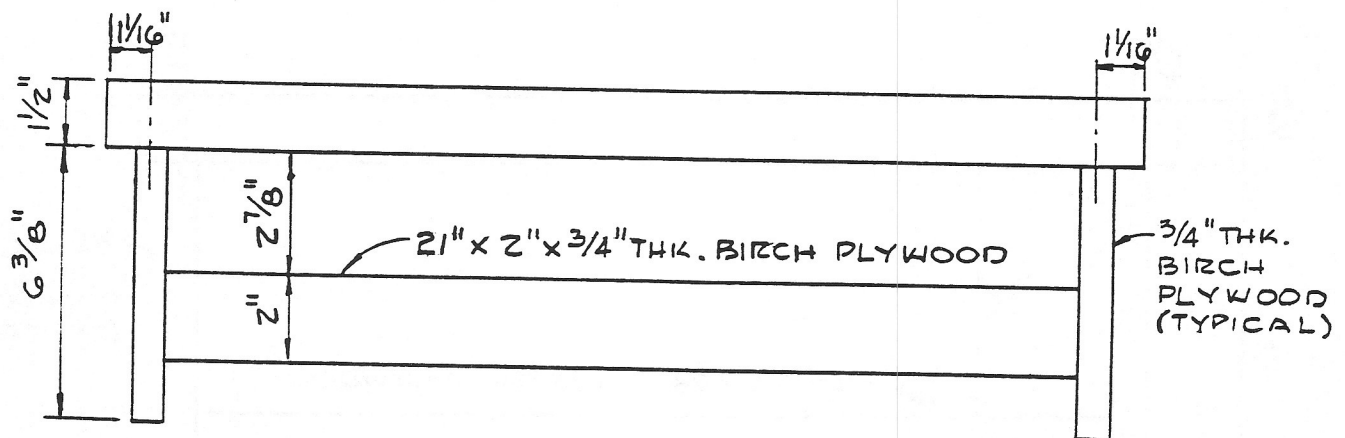
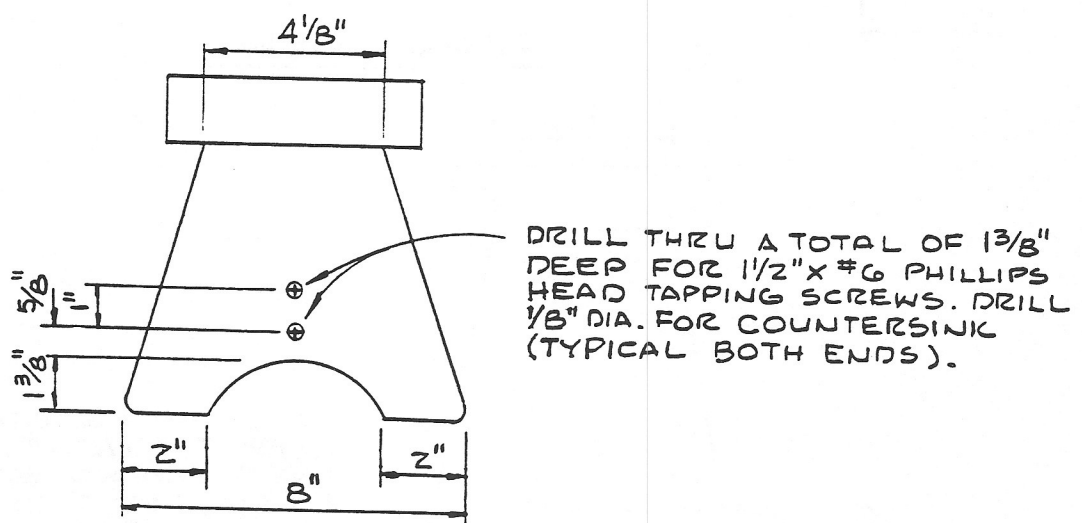
Hold the top piece on the legs and drill the screw holes into the legs. Hold the legs on the crossbar and drill the screw holes into the crossbar.

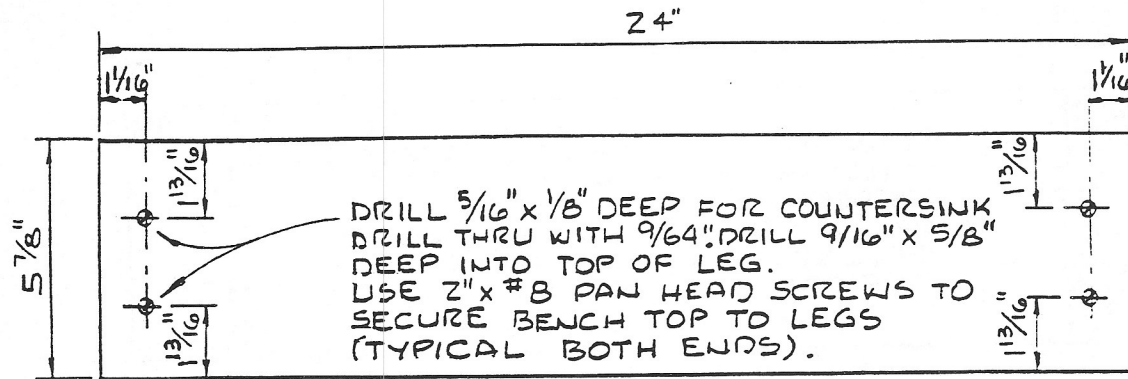
Assemble the bench by screwing everything together.

Varnish and, when dry, sand lightly. Apply a second coat of varnish and again sand lightly.

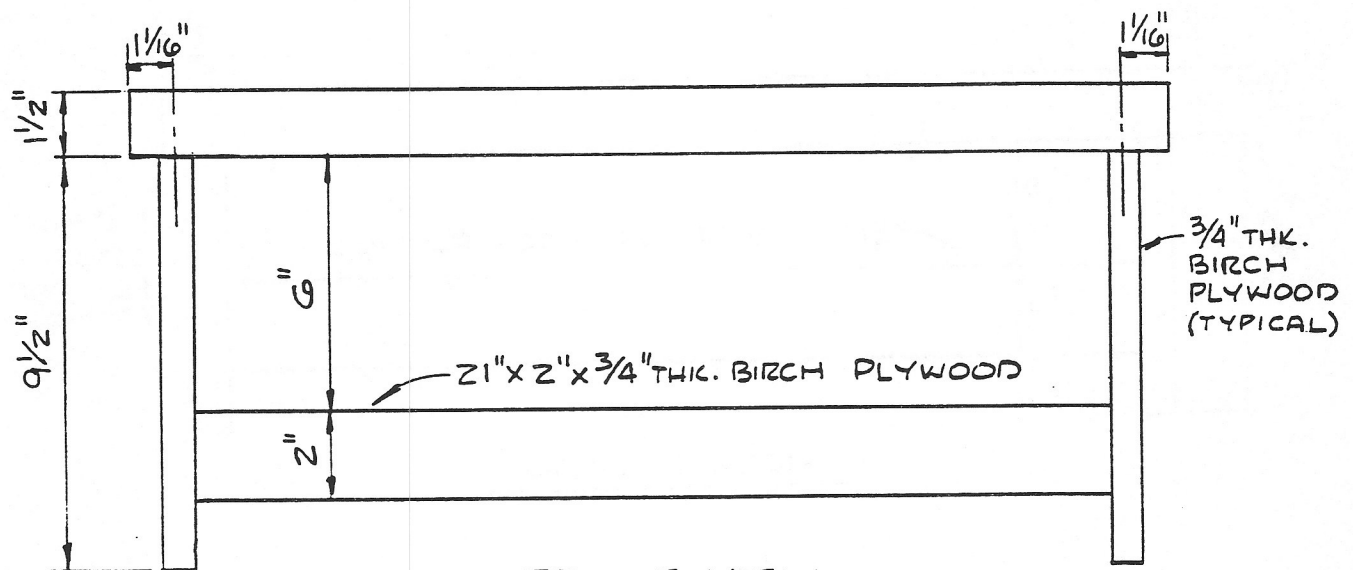


BENCH - TALL LEG

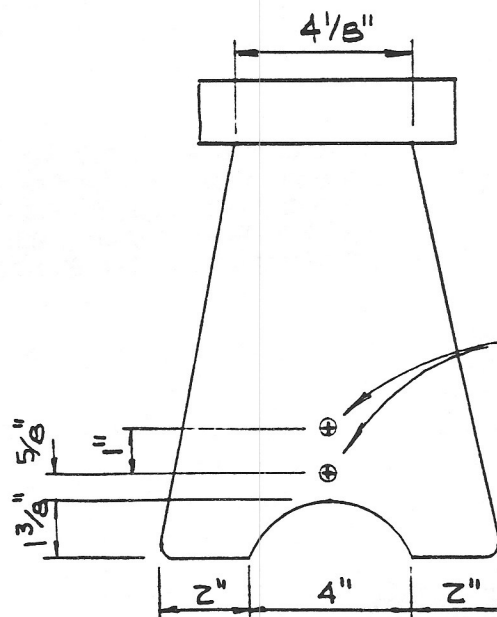
TOP VIEW OF BENCHFRONT VIEWSIDE VIEWBENCH - SHORT LEG



TOP VIEW OF BENCH



FRONT VIEW



DRILL THRU A TOTAL OF 1 3/8"  
 DEEP FOR 1 1/2" X #6 PHILLIPS  
 HEAD TAPPING SCREWS. DRILL  
 1/8" DIA. FOR COUNTERSINK  
 (TYPICAL BOTH ENDS)

SIDE VIEW

BENCH - TALL LEG

The spinning whizzer is a very old toy idea that has appeared in many different cultures. The materials can vary but keeping to the sizes, shapes and lengths indicated here will assure that the whizzer will perform well and last a long time.

Using the Spinning Whizzer is similar to using a yoyo. You need to wind it up. Then start the spin by pulling the dowel pieces apart. This must be followed by a relaxation to allow the momentum of the spinning disk to wind the string in the opposite direction. With the string wound, the dowel pieces are again pulled apart and the spin direction reverses in the same way that a yoyo travels down the string and then back up again all in one rotational direction only to rotate the opposite way on the next trip down and up. Ask your oldest child or your aunt Minnie to show you how! Have fun.

**MATERIALS NEEDED**

- One piece of 1/8" thick plastic (Lexan or similar polycarbonate material) large enough to cut out a circle with a diameter of 2 3/8"
- Two pieces of dowel 2 1/4" long and 5/8" diameter
- One 40" long piece of #18 nylon string

**TOOLS NEEDED**

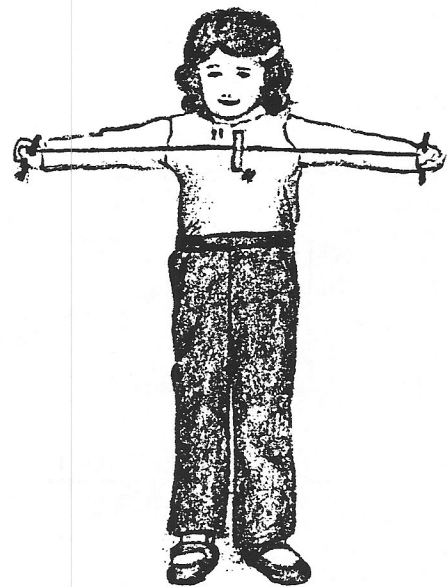
- Some way of cutting out a circle of plastic. The easiest way is by using a circle cutter and then smoothing the edges on a sander.
- A set of drills and brace, power drill or drill press
- A saw to cut the dowels to length
- Matches to seal the cut edges of the nylon string

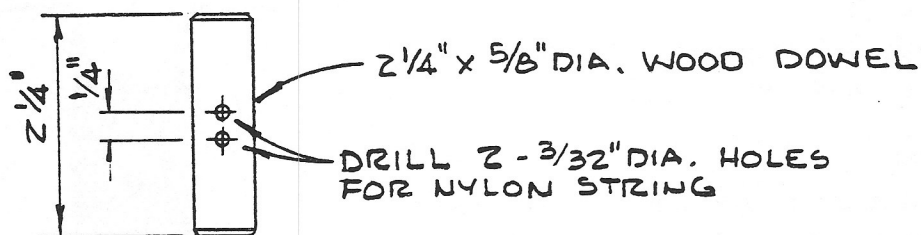
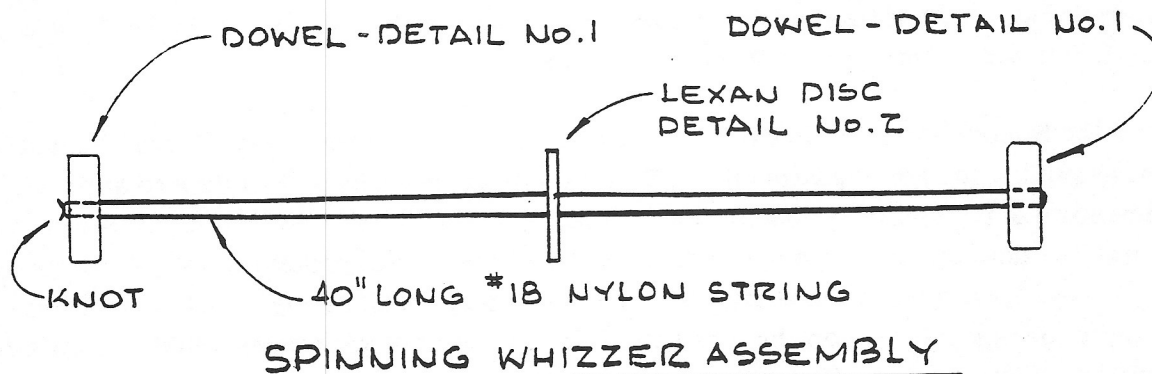
**CONSTRUCTION SUGGESTIONS**

Leaving the protective paper on the plastic, cut a disk of 2 3/8" diameter. Locate the center holes for the nylon string and the four 1/2" diameter holes drilled as shown on Detail No. 2. These latter holes produce the whizzing sound when the disk is spun. Smooth the edges throughout.

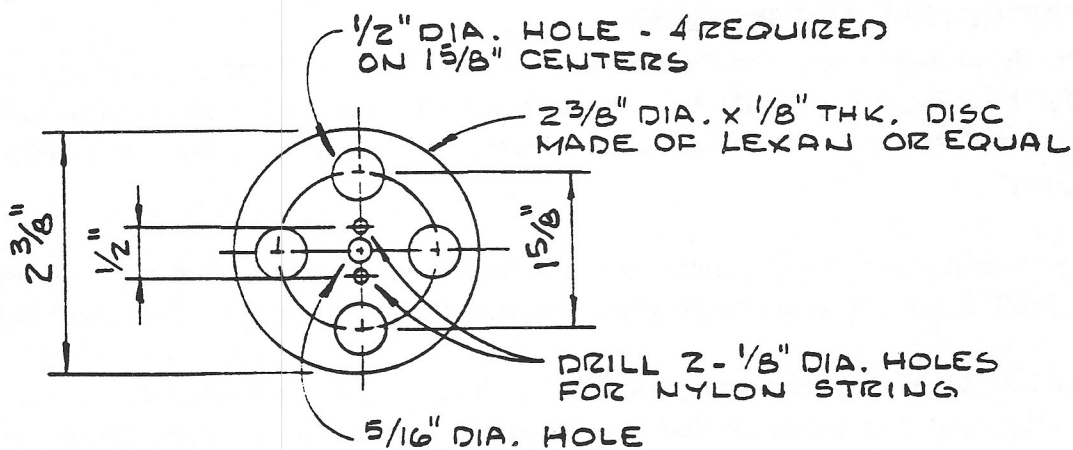
Cut the dowel pieces to 2 1/4" length and bevel the cut edges on both ends of both pieces. Drill 2 3/32" holes 1/4" apart in the dowel pieces for the nylon string as shown on Detail No. 1.

Cut a 40" length of #18 nylon string and flame both ends with a match to keep it from unraveling. Assemble the string, dowels and disk as shown in the Assembly drawing. Tie a knot and cement with epoxy. When set, center disk and apply small bit of epoxy to keep the disk centered.





DETAIL No.1 - DOWEL  
(2 REQ'D)



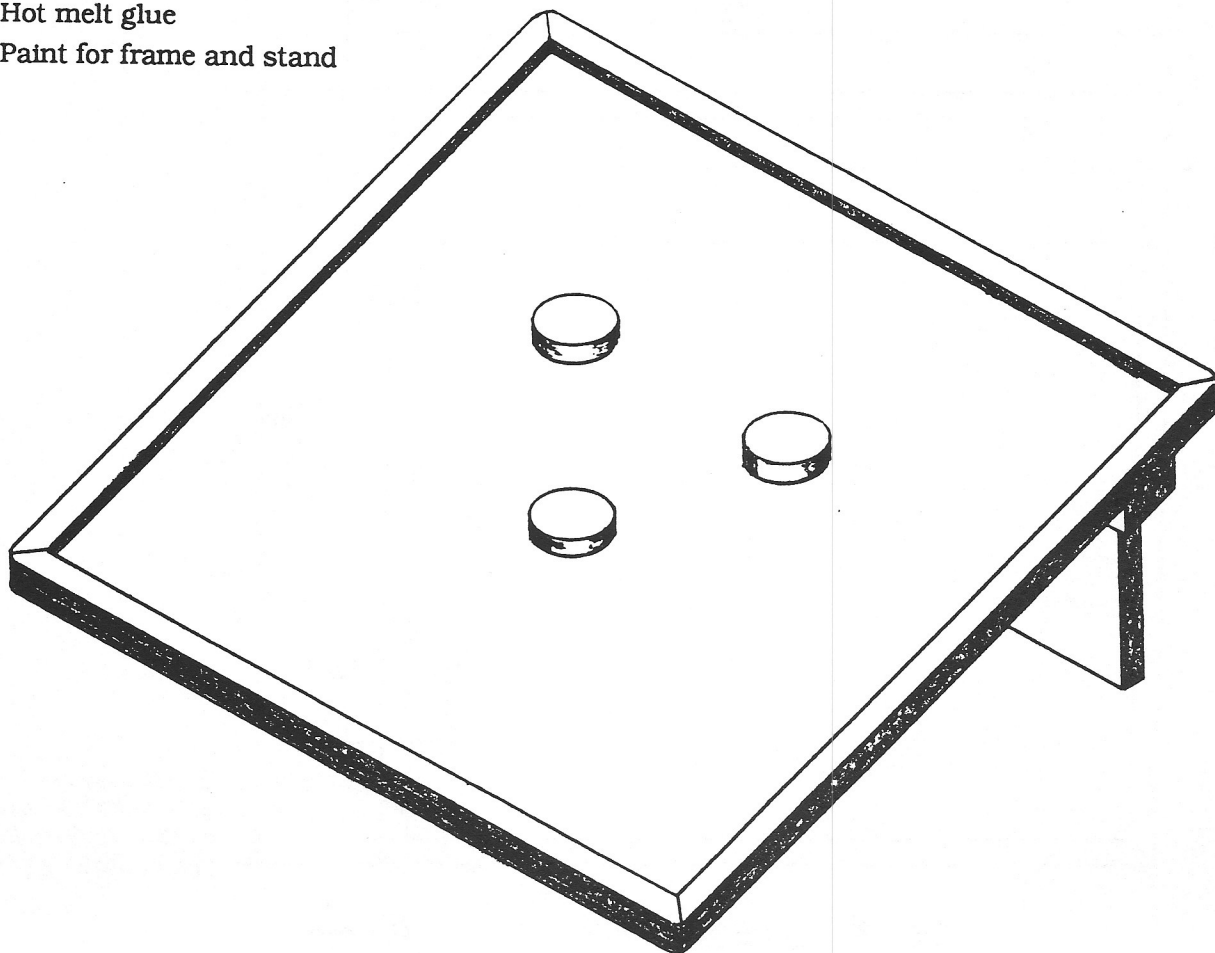
DETAIL No.2 - LEXAN DISC

The Magnetic Gameboard is quite easy to make. Because it requires pieces of sheet metal cut by a sheet metal shop (furnace and duct installers) to assure that there are no curled edges, making multiple boards at the same time would take advantage of your trip to the metal supplier.

Any intriguing objects can be affixed using magnets. Shapes, small blocks with pictures, letters, numbers, game pieces or even plastic animals can be fun to manipulate on the board.

### **MATERIALS NEEDED**

- A 15" x 15" piece of 24 or 26 gauge steel sheet
- Lacquer thinner for cleaning the steel
- Spray enamel, Varathane or equal, satin finish rather than gloss
- A 15" x 15" piece of 1/4" tempered Masonite (hardboard)
- 5 1/2' of 1/2" x 1/2" clear birch for frame (cut from 16" x 3" x 3/4" piece)
- A 16 1/8" x 1 1/2" x 1/2" piece of pine for hinge support
- A 14 5/8" x 5" x 1/2" piece of pine for hinged stand
- Two pieces 5" x 1/2" x 1/4" pine for hinged stand stiffeners
- Two 1 1/2" x 1" brass hinges with four screws each
- Five 1/2" diameter rubber bumpers
- Twelve plastic milk bottle caps 1 5/8" diameter x 1/2" high in four colors. Obtain from a local dairy that bottles gallon plastic jugs
- Hot melt glue
- Paint for frame and stand





- Twelve doughnut-shaped magnets approximately  $1\frac{1}{8}" \times \frac{3}{16}"$  thick with  $\frac{5}{16}"$  center hole. Obtain from Radio Shack catalog # 64-1885.
- Brads  $\frac{1}{2}"$  long to nail the stiffener pieces to the hinged stand
- Tube of caulking such as "Liquid Nails" made by Macco Adhesives, Glidden Company

### TOOLS NEEDED

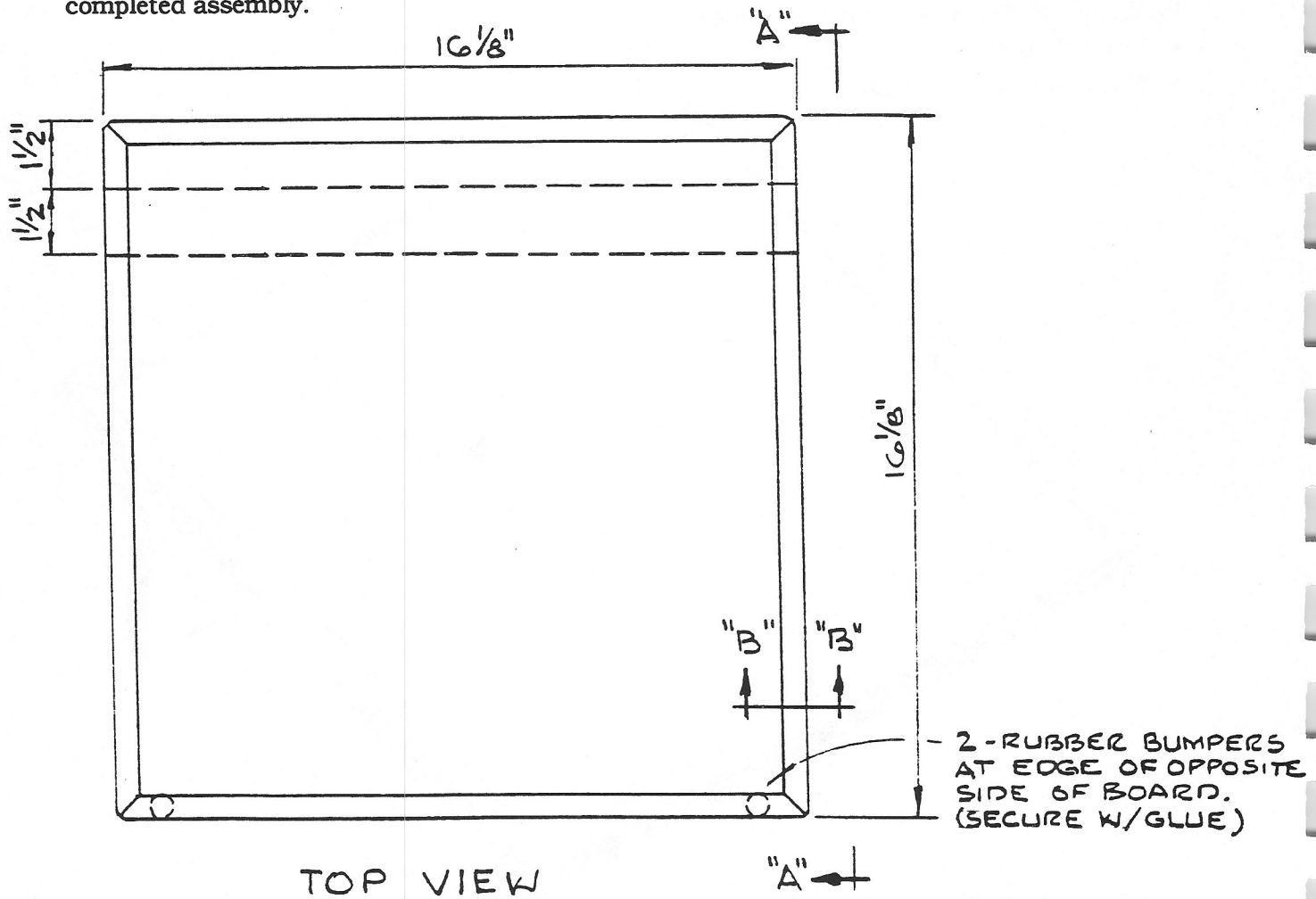
- Table saw
- Sander
- Hammer, screwdriver, sanding block, etc.

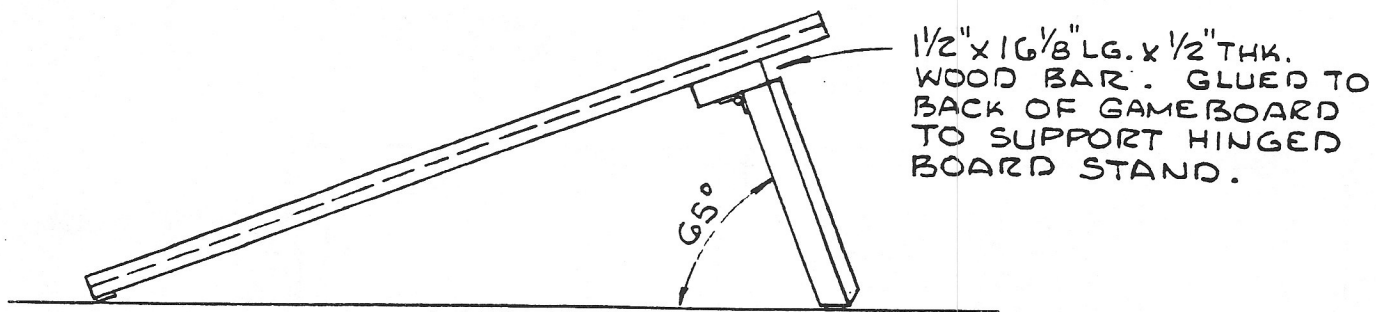
### CONSTRUCTION SUGGESTIONS

Get the sheet metal cut to  $15" \times 15"$ . Cut the Masonite (hardboard) to  $15" \times 15"$ . Glue the sheet metal to the Masonite using a small amount of Liquid Nails. Clean the steel with lacquer thinner or spray paint the steel.

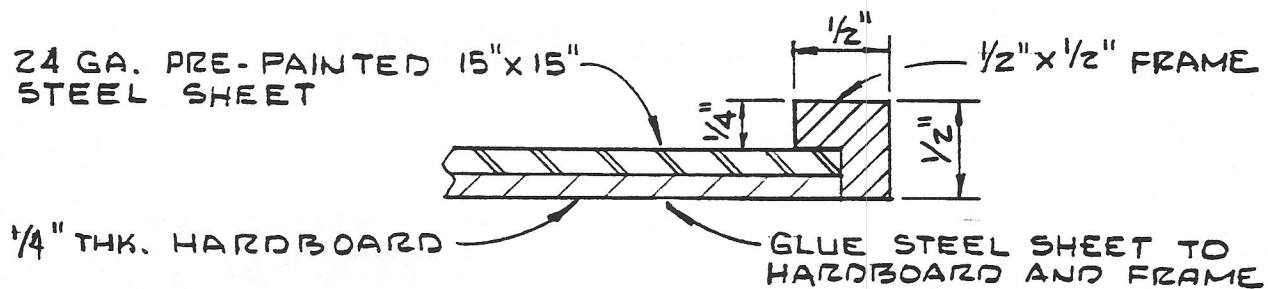
Cut out the frame pieces and the slot into which the steel and Masonite fit. Cut the frame pieces to length, sand, and paint. Glue the frame onto the steel and Masonite assembly.

Cut out the hinge support, the hinge stand, and the stand stiffeners. Sand each piece. Assemble according to the drawing details using glue, brads, and the hinge screws. Varnish the completed assembly.



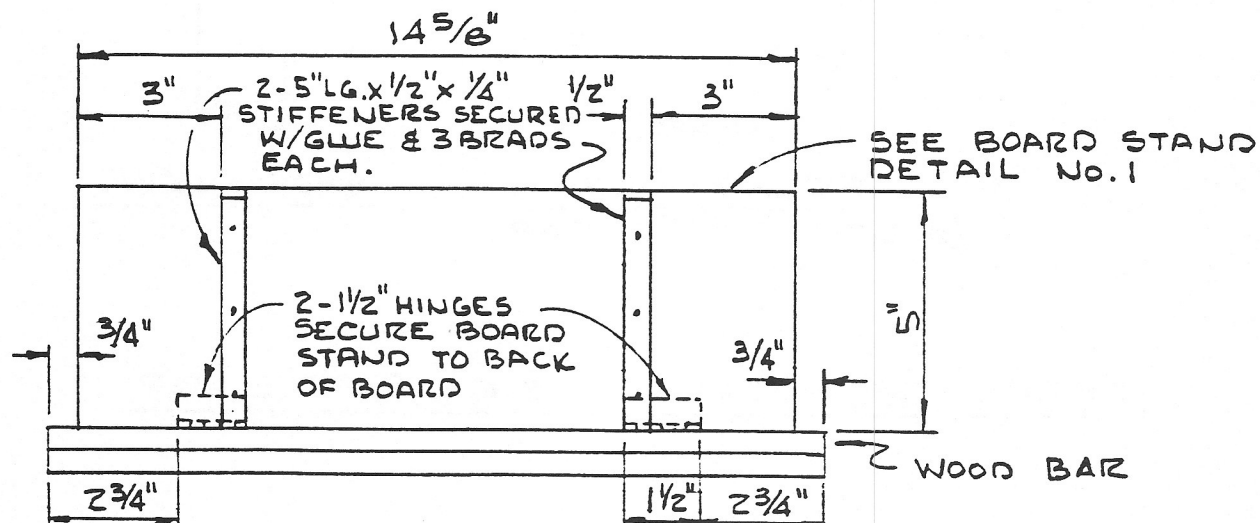


VIEW "A-A"

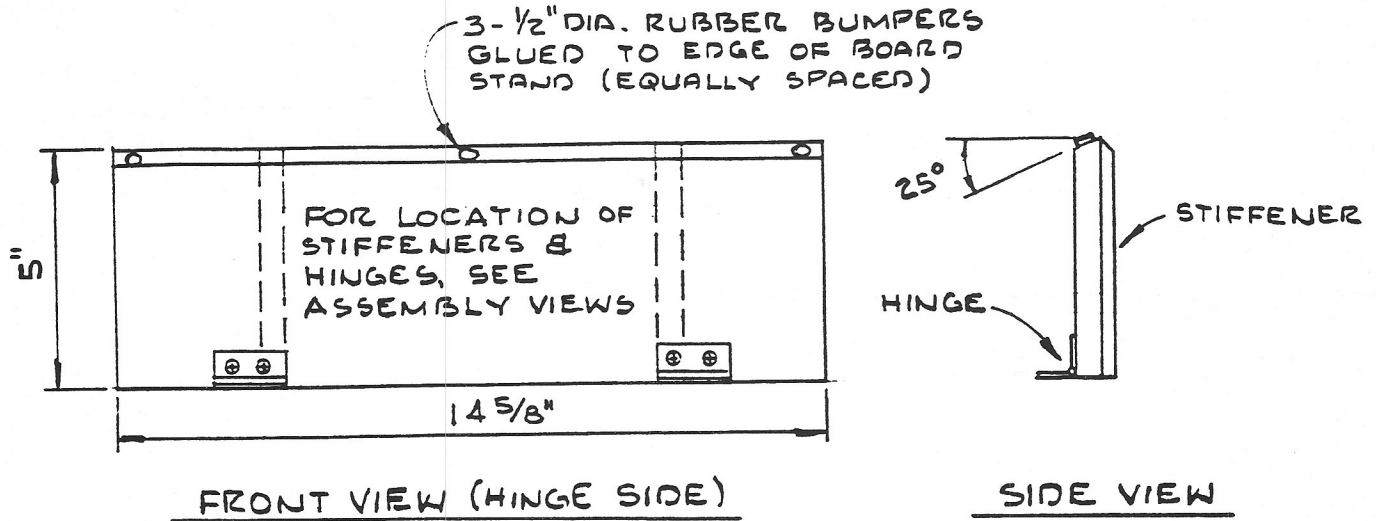


SECTION "B-B"

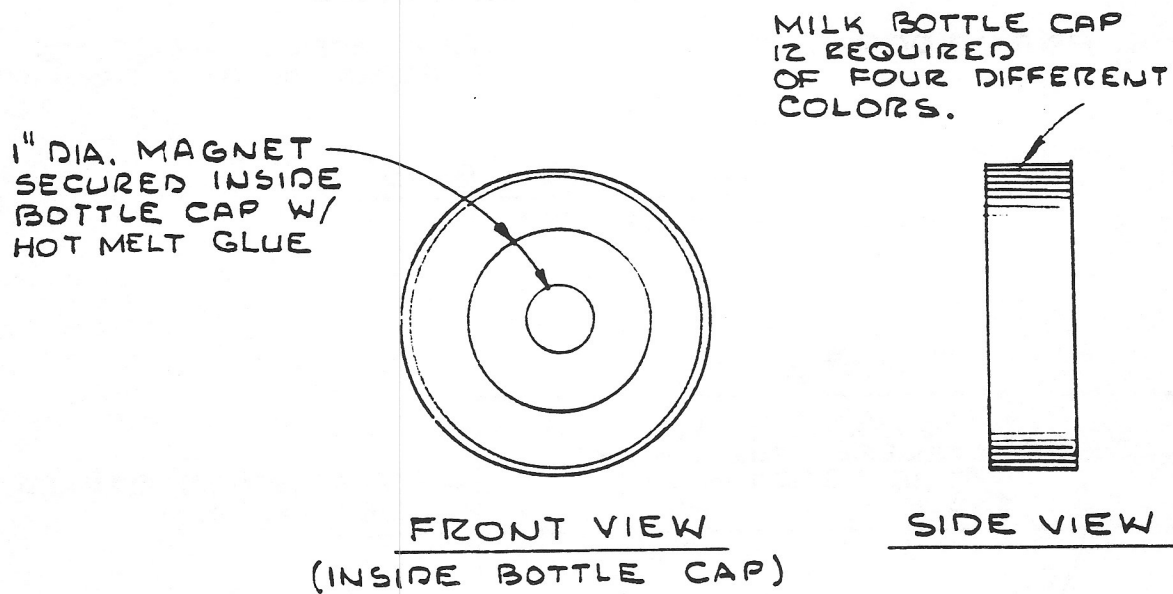
FULL SCALE



REAR VIEW



BOARD STAND - DETAIL No. 1



DETAIL OF MAGNET INSIDE BOTTLE CAP